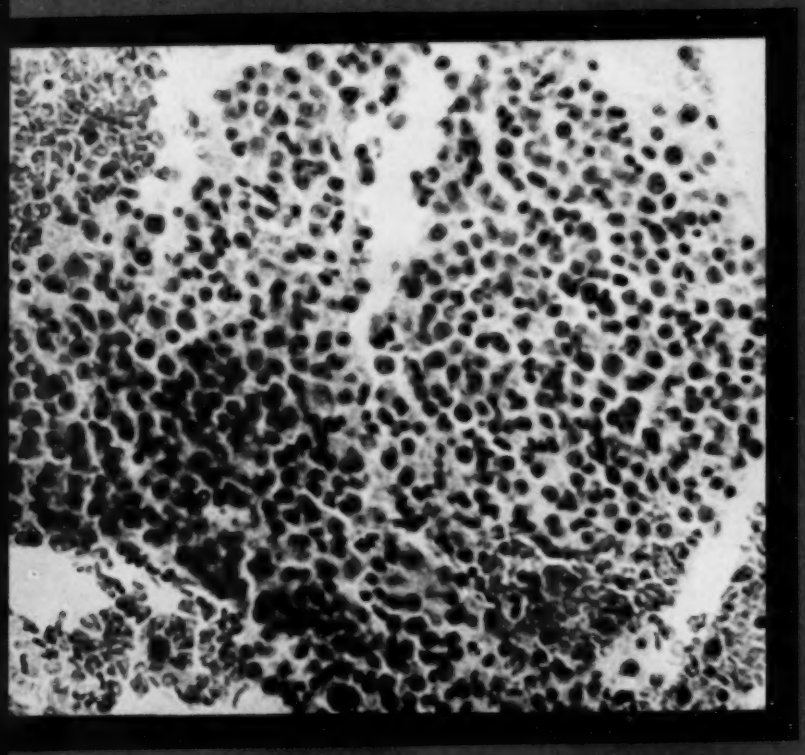
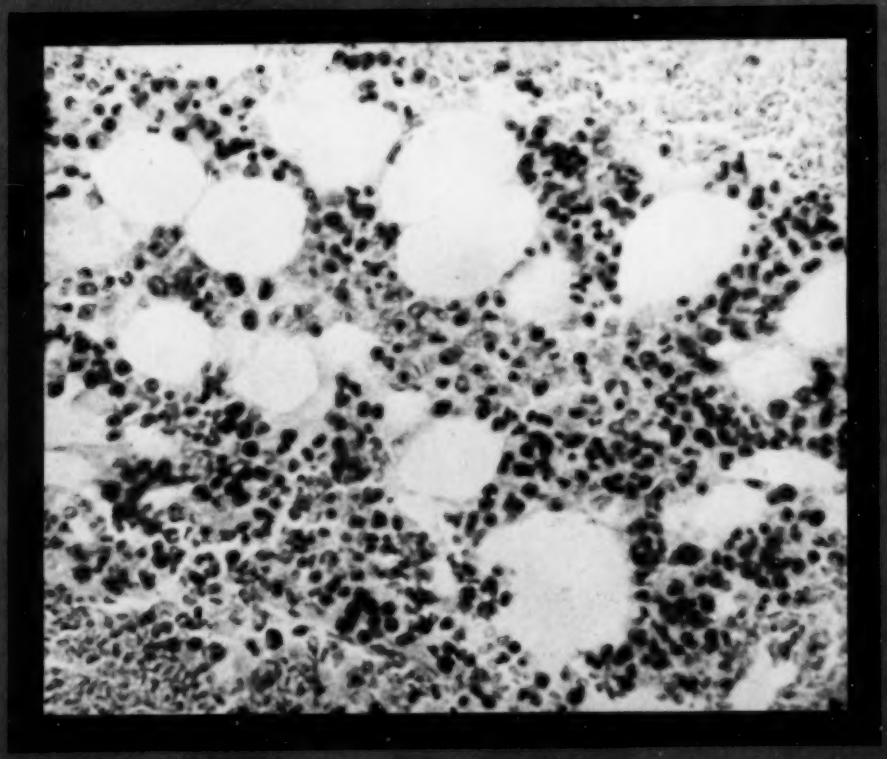
PUBLIC HEALTH REPORTS

In this issue

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service



Chemical Control of Cancer



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Chemical Control of Cancer

The frontispiece shows photomicrographs of bone marrow particles from a 46-year-old man with acute leukemia before and after treatment with a combination of a folic acid antagonist and a purine analog.

Before treatment (top) leukemic cells have densely infiltrated the marrow. The various types of cells ordinarily seen in normal bone marrow are virtually absent.

Following treatment (bottom) leukemic cells are no longer recognizable in the section. A decrease to normal in overall cellularity is evidenced by the fat content in the marrow particle. The precursors of red blood cells and white blood cells are now present in proper proportion. This marrow is morphologically indistinguishable from normal. The patient's symptomatology remitted and he returned to clinical well-being.

A review, "The Chemical Control of Cancer" by Dr. James F Holland, appears on page 1151.

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PUBLIC HEALTH MONOGRAPH No. 24 . . . Appraising the clinical resources in small hospitals.

Faye G. Abdellah and Eugene Levine.

39 pages. A summary and information on availability appear on pages 1215–1216.

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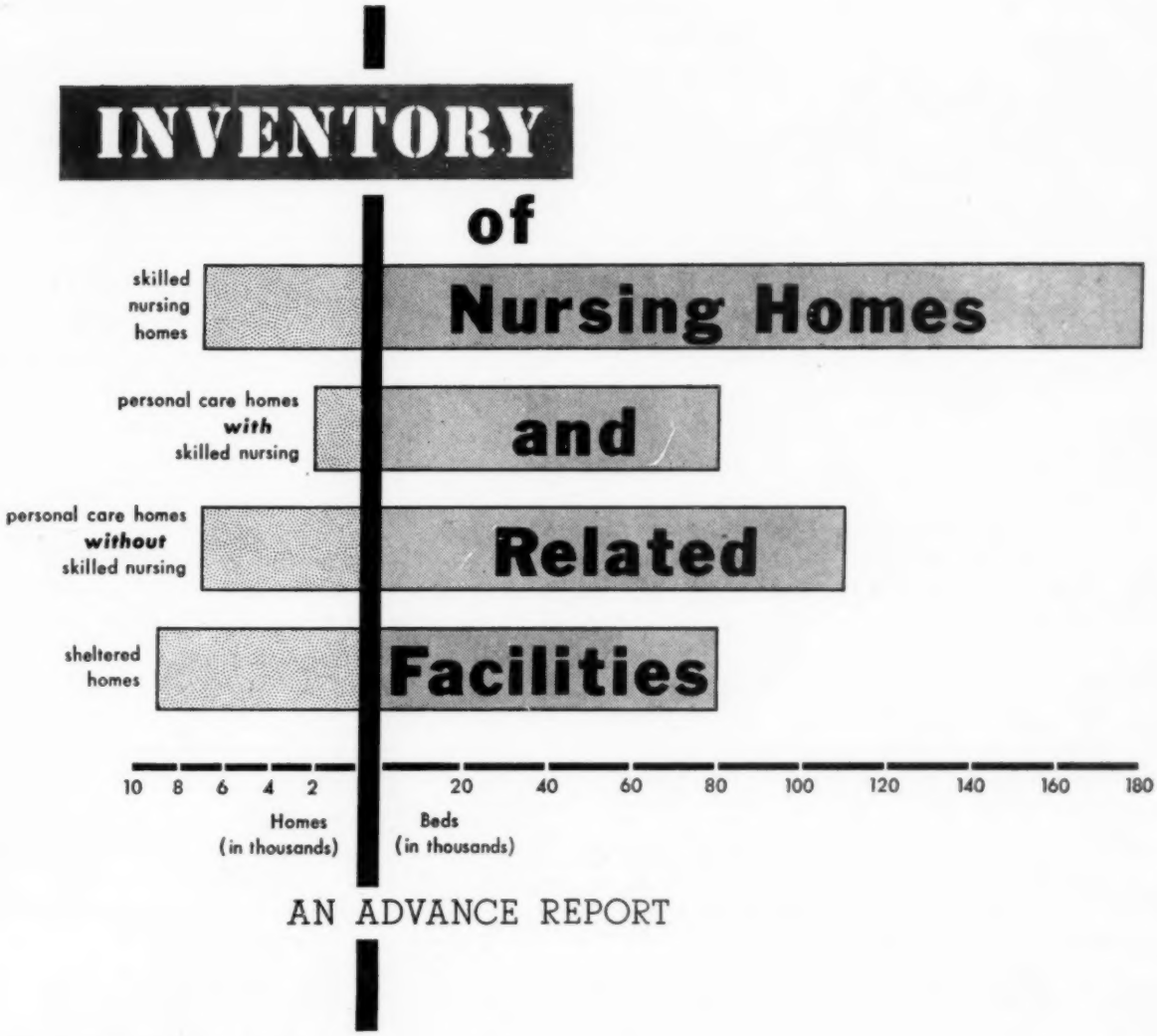
INVENTORY of Nursing Homes and Related Facilities


skilled nursing homes
personal care homes with skilled nursing
personal care homes without skilled nursing
sheltered homes
10 8 6 4 2
Homes (in thousands)
20 40 60 80 100 120 140 160 180
Beds (in thousands)

AN ADVANCE REPORT

By JERRY SOLON, M.A., and ANNA MAE BANEY, B.A.

DURING the past two decades, the nursing home as an institution has developed as a significant part of this Nation's medical care facilities. For the first time, a national inventory has been taken to determine how many such homes there are and how many people they can accommodate. This is the story of how the inventory came about and what it has uncovered.

Mr. Solon and Miss Baney are health program analysts with the Division of Hospital Facilities, Public Health Service. They prepared this report under the general direction of Dr. John W. Cronin, chief of that division.

Interest in nursing homes has increased remarkably in the last few years. It has not required any research to observe that there has been a heightened public awareness of nursing homes, along with a continued increase in their number; that there has been an upsurge of concerns with standards for these homes and

with their licensing by public authorities; that nursing home operators as a group have moved toward organized professional association. The Congress of the United States has recently taken cognizance of the nursing home and has made funds available through the Public Health Service and the States to assist in the construction of nonprofit nursing homes, as well as other types of medical care facilities (*1*).

Since the enactment of the Hospital Survey and Construction Act in 1946, the Public Health Service has had the responsibility of assisting communities, through the designated official State agencies, in developing plans for the construction of chronic disease hospitals, and in constructing such facilities, as part of the overall hospital construction program (*2*). With the years came an increasing recognition, however, that the planning of chronic disease hospital facilities could not realistically be divorced from the related role of nursing homes. Although this relationship has been recognized, apparently no one has known what criteria of adequacy and balance of numbers to apply in planning these facilities interrelatedly. It became evident very soon that we could not explore this interrelatedness directly, owing to lack of the most elemental information about nursing homes on a national basis—that is, how many nursing homes are there, and where are they? Nor could an informed approach be made in planning the implementation of the new amendments relating to nursing home construction in the absence of such elemental facts. This lack of basic information has also been an obstacle to many others who have a related concern in the area of nursing homes.

With the aim of supplying basic national data on the number and types of existing nursing homes, the Division of Hospital Facilities of the Public Health Service set out to take a national inventory. This was accomplished through the State agencies administering the Hospital Survey and Construction Program. Each State agency was asked to furnish information which was already available to them or to other agencies and organizations or which was readily obtainable through such sources. To the extent that detailed field surveys were not requested for this particular purpose, the resulting data lack some degree of accuracy and completeness. We regard the results, however, as at least getting us into the area of reliable data, where heretofore we have had nothing or, at best, unverifiable estimates.

This advance report is being made while further processing of detailed data reported in the inventory is still under way. When the results of the complete processing become available, they will permit (*a*) the refinement of the estimates presented in this report, (*b*) a more penetrating analysis, on a local rather than State basis, of the nature of the distribution of these facilities, and (*c*) the publication of a final and complete report on the findings of the inventory. In view of the widespread demand for such data and their timeliness with respect to immediate problems, this preliminary analysis is designed to report some of the basic findings as early as possible.

The information presented is based on reports received during April to October 1954 from 47 States, the District of Columbia, Alaska, Hawaii, and Puerto Rico. For ease of comparison, we will refer to all of these 51 jurisdictions as "States." The Virgin Islands did not report, and Kentucky reported too incompletely to be included in the national compilation. The reporting States inventoried the different types of homes with varying degrees of completeness. According to the information provided, only 32 States submitted substantially complete reports for each of the several types of facilities encompassed in the inventory. The variability in completeness of reporting was taken into consideration in projecting national estimates.

Number and Types of Facilities

Taking an overall view of the variety of facilities covered by the inventory, we find in the United States approximately 25,000 "homes." These include essentially all types of nonhospital facilities providing nursing or supportive services to chronically ill, convalescing, aged, disabled, or infirm persons. More specifically, they represent nursing or convalescent homes, as well as domiciliary facilities which are predominantly for aged persons and provide at least a minimum of supportive services. They include nursing homes, homes for the aged, boarding care homes for aged persons,

Definitions and Classification

Used in the National Inventory of Nursing Homes

Level of Care	Type of Home
SKILLED NURSING CARE *includes* Those procedures employed in caring for the sick which require some technical nursing skill beyond that which the ordinary untrained person can adequately administer. These may include full bed baths, enemas, irrigations, catheterizations, application of dressings or bandages, administration of medications by whatever method the physician orders (oral, rectal, hypodermic, intramuscular), and carrying out other treatments prescribed by the physician which involve a like level of complexity and skill in administration. They may be provided by either professional or practical nursing personnel, so long as they extend beyond "personal care" as described below.	**SKILLED NURSING HOME** Provides "skilled nursing care" as its primary and predominant function.
PERSONAL CARE *includes* Such personal services as help in walking and getting in and out of bed, assistance with general bathing, help with dressing or feeding, preparation of special diet, supervision over medications which can be self-administered, and other types of personal assistance of this order.	**PERSONAL CARE HOME,** ***with skilled nursing*** Provides some "skilled nursing care," but only as an adjunct to its primarily domiciliary or "personal care" function. **PERSONAL CARE HOME,** ***without skilled nursing*** Provides "personal care," with no "skilled nursing care"
SHELTER *includes* Room and board and minimum services of a domiciliary nature such as laundry, personal courtesies as occasional help with correspondence or shopping, and occasional helping hand short of the routine "personal care" described above.	**SHELTERED HOME** Provides "shelter" with its associated minimum services to aged residents who essentially manage their own care and affairs.

county homes, children's convalescent homes, special nursing homes for alcoholics, drug addicts, or mentally disturbed patients, and the like. Excluded are maternity homes and domiciliary facilities for children. And, unless they distinctly meet the defined criteria for a nursing home giving primarily "skilled nursing care," such facilities as institutions for the blind and the deaf and institutions for the mentally deficient are also excluded.

The 25,000 homes covered in the inventory can accommodate about 450,000 people. This means that there is a combined ratio of nearly 3 beds per 1,000 population for the variety of facilities included here.

These various facilities, as might be anticipated from the description of the inventory's coverage, range from the professional type of nursing home furnishing highly skilled and intensive nursing care to the boarding home for aged persons which provides only the simplest supportive services.

How to differentiate the types of homes within this broad range is a difficult problem, but one which the present inventory has sought to solve. Inevitably, this involves definitions containing some arbitrary elements, since the facilities with which we are dealing do not fall neatly into specific categories. Rather, they shade imperceptibly from one level of care into another. With full recognition of the impact, particularly on the borderline facilities, of definitions which slice into this gradient, we have established a classification which, however imperfect, has considerable basis in practice.

The classification of facilities was accomplished by determining from information furnished on the inventory reports:

1. Whether the highest level of service provided by the particular home is "skilled nursing care," or "personal care," or "shelter"; and,
2. Where "skilled nursing care" is provided, whether that type of care is the primary and predominant function of the facility, or whether it is an adjunct to a primarily domiciliary or personal care function.

The definitions employed for the three levels of care are given in the inset, together with a description of the four categories of homes which hinge on these definitions. We will distinguish the four types of facilities throughout the discussion of the inventory.

First, we will start with a brief rundown of the number of facilities of each type. These are tabulated in table 1. We will then follow with an analysis of the distribution of skilled nursing homes by State, and then examine some of the factors with which that distribution seems to be associated. And, finally, we will look at the interrelationship among the levels of supply of the several types of facilities.

Skilled nursing homes. There are about 7,000 skilled nursing homes in the country. They provide 180,000 beds, or an average of 1.1 beds per 1,000 population. In the total framework of the facilities embraced in the inventory, the skilled nursing homes comprise 40 percent of the beds. The size of the average skilled nursing home is about 25 beds.

Personal care homes with skilled nursing. These homes are relatively large, averaging 40 beds. Although a majority are proprietary establishments, the large average size of these homes undoubtedly flows from the nonproprietary complement—public homes and nonprofit homes for the aged. The public and nonprofit

Table 1. National estimates of the number of nursing homes and related facilities, 1954

Type of facility	Number		Percent distribution		Approximate average number of beds per home	Number of beds per 1,000 population
	Homes	Beds	Homes	Beds		
Total United States [1]	25,000	450,000	100	100	20	2.8
Skilled nursing homes	7,000	180,000	28	40	25	1.1
Personal care homes with skilled nursing	2,000	80,000	8	18	40	.5
Personal care homes without skilled nursing	7,000	110,000	28	24	15	.7
Sheltered homes	9,000	80,000	36	18	10	.5

[1] Includes Territories.

homes in this category present a well-known traditional pattern, that of a home domiciliary in general character but providing skilled nursing care either in a separate infirmary or at regular bedside for a minority of the residents who are temporarily or permanently ill or disabled.

Personal care homes with skilled nursing number about 2,000, and have a total of about 80,000 beds. We surmise that perhaps as many as one-fourth of these beds are for patients receiving skilled nursing care. If this portion (20,000) of the beds in the personal care homes with skilled nursing is added to the 180,000 beds in skilled nursing homes, we have, all told, 200,000 beds for skilled nursing care (1.2 beds per 1,000 population).

Personal care homes without skilled nursing. Paralleling the skilled nursing homes in number but not in size, personal care homes without skilled nursing are represented by 7,000 establishments with 110,000 beds. They are typically quite small in capacity, averaging about 15 beds.

If we think of the total of personal care beds available, we might add to the 110,000 beds in these homes the estimated 60,000 beds available for personal care alone in the preceding category—personal care homes which also provide some skilled nursing care. This yields a crude total of 170,000 beds for personal care (1.0 beds per 1,000 population).

Sheltered homes. These homes—whose prototype would be the proprietary boarding home for older persons, which offers somewhat more than mere room and board but less than continuing personal services as found in the personal care homes—are typically the smallest of the four types of facilities studied. The average home approaches 10 beds.

Among the several types of facilities inventoried in the State reports, sheltered homes are the most incompletely reported—because they resemble the commercial boarding house which provides no other supportive services. Acceptance of the reported information on sheltered homes, to the extent that the reports are presumed to cover this type of home, and projecting this information to a national total, produces a count of 9,000 establishments with 80,000 beds. At best, this can only be regarded as a minimum estimate.

Variations in Availability of Nursing Homes

The skilled nursing homes are the core of our interest in this study. We are interested in the other types of facilities because to discover the relationship of their availability and role to the availability and role of skilled nursing homes would enlighten us on the need for nursing home facilities. In a broader perspective, too, our concern is with the provision of facilities for care of the chronically ill. All of these types share, each in its own way, in meeting the needs of chronically ill people. In what follows, this balancing of interests will be reflected in our giving primary emphasis and attention to the skilled nursing homes, and later, involving the other types as complementary data.

The range among the States in the availability of beds in skilled nursing homes is very wide. Alaska has none of this type of facility, and quite a few States have next to none. At the opposite extreme is Washington with 3.6 beds per 1,000 population (*3*). The Nation's average, as stated earlier, is 1.1 beds per 1,000 population.

Individual State rates are given in table 2. Summarizing these rates into categories of availability, we have the following grouping of the 51 States for which data are available:

Number of skilled nursing home beds per 1,000 population	*Number of States*	*Percent distribution of population*
Less than 0.1	5	5.9
0.1–0.4	12	15.5
0.5–0.9	15	25.8
1.0–1.4	8	27.4
1.5–2.4	8	22.9
2.5 and over	3	2.5
Total	51	100.0

The differing pattern of distribution as between number of States and their populations points to a tendency for the more populous States to have a larger supply of beds in skilled nursing homes relative to population (see also State map). In the discussion that follows we

Table 2. Number of facilities reported in the inventory of

State	Civilian population (in thousands)	All facilities [1]			Skilled nursing homes		
		Number		Bed ratio per 1,000 population	Number		Bed ratio per 1,000 population
		Homes	Beds		Homes	Beds	
Total, 51 States reported [3]	159,032	—	—	—	6,539	171,816	1.1
Total, 32 States [1]	82,147	13,554	234,152	2.9	3,767	92,663	1.1
Alabama	3,100	—	—	—	67	1,446	0.5
Arizona	974	71	1,172	1.2	7	132	.1
Arkansas	1,891	79	1,500	.8	61	1,281	.7
California	12,213	2,856	32,072	2.6	573	12,806	1.0
Colorado	1,408	182	3,788	2.7	52	1,775	1.3
Connecticut	2,210	714	12,072	5.5	193	4,868	2.2
Delaware	362	—	—	—	1	44	.1
District of Columbia	820	79	2,461	3.0	7	311	.4
Florida	3,436	309	3,782	1.1	43	475	.1
Georgia	3,561	—	—	—	56	1,822	.5
Idaho	611	82	1,130	1.8	1	36	.1
Illinois	9,106	1,646	34,094	3.7	527	16,753	1.8
Indiana	4,203	495	13,186	3.1	175	3,035	.7
Iowa	2,636	1,704	16,398	6.2	278	6,303	2.4
Kansas	1,972	459	6,477	3.3	5	118	.1
Louisiana	2,901	91	3,012	1.0	53	1,631	.6
Maine	916	459	4,541	5.0	189	2,491	2.7
Maryland	2,522	—	—	—	112	3,604	1.4
Massachusetts	4,906	1,094	24,422	5.0	484	10,854	2.2
Michigan	7,010	586	16,398	2.3	458	14,256	2.0
Minnesota	3,098	329	10,153	3.3	178	4,242	1.4
Mississippi	2,180	—	—	—	2	24	.0
Missouri	4,115	—	—	—	95	3,832	.9
Montana	624	83	1,554	2.5	8	289	.5
Nebraska	1,358	290	5,714	4.2	3	440	.3
Nevada	209	—	—	—	10	239	1.1
New Hampshire	528	239	4,712	8.9	75	1,681	3.2
New Jersey	5,174	—	—	—	147	5,220	1.0
New Mexico	752	86	819	1.1	36	547	.7
New York	15,368	—	—	—	767	20,717	1.3
North Carolina	4,162	281	4,674	1.1	4	59	.0
North Dakota	635	75	2,210	3.5	7	143	.2
Ohio	8,535	—	—	—	471	12,838	1.5
Oklahoma	2,232	282	3,503	1.6	109	1,927	.9
Oregon [6]	1,634	—	—	—	171	3,914	2.4
Pennsylvania	10,755	—	—	—	146	7,448	.7
Rhode Island	790	169	[2] 2,800	3.5	40	642	.8
South Carolina	2,171	—	—	—	29	618	.3
South Dakota	659	103	1,758	2.7	2	18	.0
Tennessee	3,344	165	3,045	.9	29	700	.2
Texas	8,240	—	—	—	120	2,683	.3
Utah	753	—	—	—	3	73	.1
Vermont	383	—	—	—	82	841	2.2
Virginia	3,418	—	—	—	144	3,129	.9
Washington	2,459	—	—	—	298	8,964	3.6
West Virginia	1,946	—	—	—	51	1,697	.9
Wisconsin	3,574	458	13,888	3.9	152	4,267	1.2
Wyoming	302	51	615	2.0	13	151	.5
Alaska	171	0	0	0	0	0	0
Hawaii	484	27	1,570	3.2	3	366	.8
Puerto Rico	2,221	10	632	.3	2	66	.0

[1] Shown only for 32 States which reported substantially completely for all 4 types of facilities. State total exceeds sum of 4 types in a few cases, where some facilities were not identified as to type. [2] Probably underreported. [3] Virgin Islands did not report. Kentucky's total of 149 homes with 2,604 beds could not be classified by type, for lack of information on level of service. [4] "Sheltered homes" includes some unknown number of facilities which

nursing homes and related facilities, by State, 1954

Personal care homes with skilled nursing			Personal care homes without skilled nursing			Sheltered homes [2]			State
Number		Bed ratio per 1,000 population	Number		Bed ratio per 1,000 population	Number		Bed ratio per 1,000 population	
Homes	Beds		Homes	Beds		Homes	Beds		
1,482	68,912	0.6	4,977	86,687	0.7	5,122	45,446	0.5	Total, 51 States reported.[3]
994	37,589	.5	3,812	56,593	.7	4,900	43,655	.5	Total, 32 States.[1]
6	52	0.0	—	—	—	—	—	—	Alabama.
13	426	.4	51	614	0.6	0	0	0	Arizona.
1	12	.0	0	0	0	17	207	.1	Arkansas.
30	2,499	.2	(4)	(4)	(4)	[4] 2,253	[4] 16,767	[4] 1.4	California.
52	869	.6	59	613	.4	19	531	.4	Colorado.
13	1,617	.7	283	3,087	1.4	[5] 225	[5] 2,500	[5] 1.1	Connecticut.
—	—	—	41	391	1.1	—	—	—	Delaware.
13	1,453	1.8	28	391	.5	31	306	.4	District of Columbia.
73	1,194	.3	190	1,938	.6	3	175	.1	Florida.
4	369	.1	19	442	.1	—	—	—	Georgia.
36	765	1.3	45	329	.5	0	0	0	Idaho.
43	3,215	.4	38	978	.1	[5] 1,000	[5] 10,000	[5] 1.1	Illinois.
152	2,723	.6	168	7,428	1.8	0	0	0	Indiana.
24	454	.2	771	3,471	1.3	631	6,170	2.3	Iowa.
9	479	.2	292	4,728	2.4	124	966	.5	Kansas.
10	570	.2	22	748	.3	6	63	.0	Louisiana.
3	17	.0	40	844	.9	227	1,189	1.3	Maine.
22	1,514	.6	36	613	.2	—	—	—	Maryland.
20	2,034	.4	588	11,226	2.3	0	0	0	Massachusetts.
0	0	0	17	508	.1	104	1,634	.2	Michigan.
104	5,216	1.7	47	695	.2	0	0	0	Minnesota.
—	—	—	39	719	.3	43	—	—	Mississippi.
238	6,386	1.6	82	1,279	.3	—	—	—	Missouri.
11	395	.6	59	814	1.3	5	56	.1	Montana.
4	382	.3	282	4,883	3.6	1	9	.0	Nebraska.
6	74	.4	—	—	—	—	—	—	Nevada.
23	1,112	2.1	65	1,159	2.2	[5] 75	[5] 750	[5] 1.4	New Hampshire.
6	764	.1	62	3,336	.6	—	—	—	New Jersey.
0	0	0	24	90	.1	26	182	.2	New Mexico.
169	21,194	1.4	250	4,903	.3	—	—	—	New York.
30	1,417	.3	243	3,198	.8	0	0	0	North Carolina.
4	404	.6	64	1,663	2.6	0	0	0	North Dakota.
—	—	—	—	—	—	—	—	—	Ohio.
98	1,107	.5	75	469	.2	0	0	0	Oklahoma.
—	—	—	73	1,262	.8	4	84	.1	Oregon.[6]
—	—	—	364	14,136	1.3	175	1,707	.2	Pennsylvania.
54	591	.7	75	1,567	2.0	0	0	0	Rhode Island.
—	—	—	—	—	—	—	—	—	South Carolina.
11	298	.5	79	1,324	2.0	11	118	.2	South Dakota.
0	0	0	85	1,571	.5	51	774	.2	Tennessee.
37	970	.1	92	1,438	.2	—	—	—	Texas.
—	—	—	68	1,224	1.6	—	—	—	Utah.
0	0	0	39	351	.9	—	—	—	Vermont.
—	—	—	—	—	—	—	—	—	Virginia.
—	—	—	—	—	—	—	—	—	Washington.
—	—	—	—	—	—	—	—	—	West Virginia.
123	6,672	1.9	107	2,039	.6	76	910	.3	Wisconsin.
20	262	.9	11	150	.5	7	52	.2	Wyoming.
0	0	0	0	0	0	0	0	0	Alaska.
12	840	1.7	4	68	.1	8	296	.6	Hawaii.
8	566	.3	0	0	0	0	0	0	Puerto Rico.

would more properly be classified as "Personal care homes without skilled nursing" if precise information on level of service were available. [5] Estimated. [6] "Personal care homes without skilled nursing" includes some unknown number of facilities which would more properly be classified to other types if the level of service were known.

NOTE: A dash (—) represents "not known."

will see how this reflects some underlying economic and demographic factors.

State Characteristics as Factors

Certain characteristics of States may be suspected of governing, or of having some relationship to, the supply of beds in skilled nursing homes. Some of these factors are examined below. Since comparable data on most of the factors to be considered are not readily available for the Territories, the following analysis will be limited to the 48 continental States (Kentucky excluded) which have provided information on skilled nursing homes.

Population 65 Years and Over

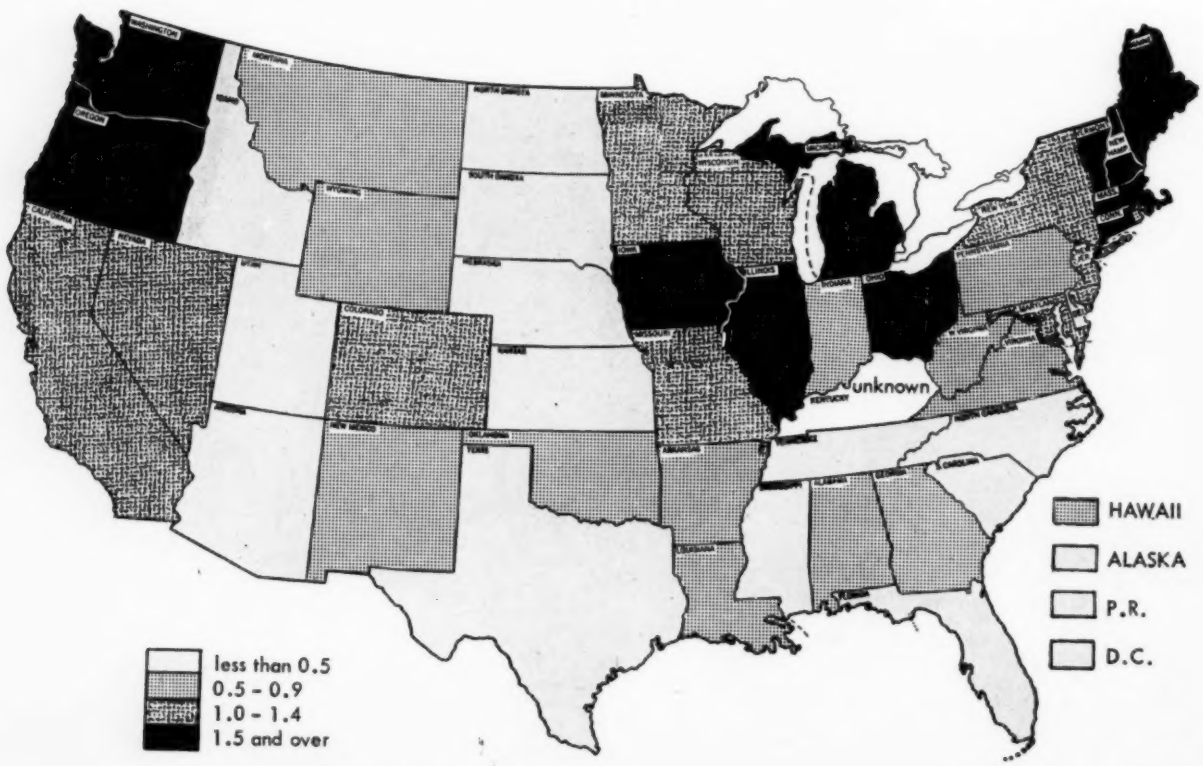
Patients in nursing homes are predominantly older people. We might therefore expect that where there are more older people there might be a correspondingly greater need for nursing home beds. Does the existing distribution of beds in skilled nursing homes bear this out?

This table shows the number of States with given proportions of persons aged 65 years and over in the population (*4*), and, for each group of States, the average number of beds per 1,000 population.

Percent population 65 and over	*Number of States*	*Skilled nursing home beds*
Less than 6.0	3	0.3
6.0–6.9	7	.5
7.0–7.9	8	.9
8.0–8.9	7	.8
9.0–9.9	15	1.4
10.0 and over	8	1.6
Total	48	1.1

There is, very clearly, a progressive increase in availability of beds in skilled nursing homes as the aged portion of the population increases. This is also reflected in comparing the concentration of population and beds in the group of 24 States whose proportion of population aged 65 and over exceeds the national average of 8.5 percent. Within the reporting group of States, these 24 States have 57 percent of the total population but account for 72 percent of the beds in skilled nursing homes.

Beds in skilled nursing homes, per 1,000 State population, 1954.



Per Capita Income

The wealthier States, in terms of per capita income, have relatively more skilled nursing home beds than do the less wealthy States. As shown below, in grouping the States according to 1953 per capita income (*5*) there is an average of only 0.3 beds per 1,000 population in States whose per capita income is less than $1,250. In contrast, States with a per capita income of $1,750 or more have an average of 1.4 beds per 1,000 population.

Per capita income of State	*Number of States*	*Skilled nursing home beds*
Less than $1,000	2	0.3
$1,000–$1,249	6	.3
$1,250–$1,499	12	.6
$1,500–$1,749	13	1.2
$1,750–$1,999	5	1.4
$2,000 and over	10	1.4
Total	48	1.1

Eighteen States exceed the 1953 national per capita income of $1,709. These States, with 59 percent of the population of the reporting States, have 76 percent of all beds in skilled nursing homes.

Rurality

The availability of beds in skilled nursing homes is related to the rural or urban character of States (*6*). The more rural a State, the lesser the proportionate supply of nursing home beds it is likely to have. Witness the following downward course of the bed ratio per 1,000 population with increasing rurality:

Percent rural population	*Number of States*	*Skilled nursing home beds*
Less than 50	31	1.2
50–59	9	.8
60–69	6	.4
70 and over	2	.1
Total	48	1.1

If the 31 predominantly urban States in the first group are broken down into small categories by degree of urbanism, their average bed ratios do not depart far from the overall urban average of 1.2 beds per 1,000 population.

Availability of Hospital Beds

If we are to regard nursing homes as a link in the chain of medical care facilities, our interest is drawn to the relationship between availability of nursing home facilities and hospital facilities. Do we find that those States which are more adequately supplied with hospital beds are also better supplied with beds in skilled nursing homes? Or is there some offsetting tendency so that the availability of one "discourages" the growth of the other?

In the case of general hospitals, there is no apparent relationship. States with different general hospital bed ratios (*7*)—grouped below—nevertheless average a quite consistent ratio of beds in skilled nursing homes.

General hospital beds per 1,000 population	*Number of States*	*Skilled nursing home beds*
Less than 3.5	18	1.0
3.5–4.4	23	1.2
4.5 and over	7	1.2
Total	48	1.1

The availability of chronic disease hospital beds (*7*), on the other hand, seems to be associated to a marked extent with the supply of beds in skilled nursing homes. Holding aside the States which have no chronic disease hospital facilities at all, we can see in the following table a tendency for the States which are better supplied with chronic disease hospital beds to have relatively more skilled nursing home beds as well.

Chronic disease hospital beds per 1,000 population	*Number of States*	*Skilled nursing home beds*
None	8	1.2
0.01–0.14	21	.7
0.15–0.49	13	1.2
0.50 and over	6	1.6
Total	48	1.1

The eight States with no chronic disease hospital facilities actually form a bimodal distribution with respect to skilled nursing homes. Four of these States have very few skilled nursing home facilities (averaging 0.3 beds per 1,000 population), while the other four have an average or superior supply compared to other States (average ratio of 1.5 beds). The former group's situation is quite understandable—conditions which lead to a relatively low supply in one type likewise produce a low supply in the related

type. The other group of States suggests reliance on the combination of general hospital care and skilled nursing homes to meet the needs of the chronically ill.

Availability of Medical Personnel

The operation of nursing homes obviously necessitates accessibility of certain types of medical personnel. Subsequent analysis of local data will be required effectively to relate the distribution of facilities with that of personnel. However, the table below documents the expected association on a State basis (*8*). States comparatively advantaged in the supply of physicians and nurses (professional and practical) also tend to have a greater volume of beds in skilled nursing homes.

Number per 100,000 population in State	*Number of States*	*Skilled nursing home beds*
Physicians:		
Less than 75	3	0.3
75–99	14	.4
100–124	15	1.4
125–149	10	1.2
150 and over	6	1.4
Total	48	1.1
Professional nurses:		
100–149	3	.4
150–199	10	.4
200–249	11	.9
250–299	9	1.4
300–349	8	1.6
350–399	3	1.2
400 and over	4	2.1
Total	48	1.1
Practical nurses:		
Less than 70	8	.6
70–79	8	1.1
80–89	10	1.3
90–99	11	1.0
100–119	6	1.0
120 and over	5	1.5
Total	48	1.1

Recapitulation

We have now seen that the volume of existing beds in skilled nursing homes, by State, is related to a number of factors which we have examined. The extent of chronic disease hospital facilities seems to have some partial correspondence to the volume of beds in skilled nursing homes. But no such association is evident with the level of supply of general hospital beds. A positive association is apparent with per capita income, "agedness" of population, proportion of the population living in urban areas, and relative availability of physicians and nurses. These are not mutually independent relationships, since the several factors are themselves interrelated. Therefore, at this point, we suggest that the availability of beds in skilled nursing homes is associated with the total complex of these factors.

Relationships Among Types of Facilities

A crucial question is what relationship exists between the availability of beds in skilled nursing homes in a State and the availability of the related types of facilities. Do States with a comparatively high or low supply of beds in skilled nursing homes also tend to have concomitantly high or low supplies of beds in personal care homes and sheltered homes? Or does a better supply in one or another type go with poorer supplies in other types?

We are able to examine this question in 32 States which reported substantially completely for all 4 types of facilities covered in the inventory. The rank order of the States in the supply of each type of facility proportionate to population is shown in table 3. A single clear-cut pattern does not emerge, but a number of conclusions may be drawn:

1. It is a rarity for a State to rank consistently high in all four types of facilities. Connecticut and New Hampshire stand as the only examples in this group of States.

2. It is fully as rare for a State to rank consistently low on all four types. Notable in this respect are Alaska, which has none of these facilities, and Puerto Rico.

3. Somewhat more frequently encountered is the State which has a combination of middle and low ranks. A group of southern States fall in this category: Arizona, Arkansas, Florida, Louisiana, North Carolina, Oklahoma, and Tennessee.

4. By far the most common situation is a marked difference of ranks for a State among the several types of facilities. About 20 of the 32 States show this marked tendency to occupy quite different positions in the different types

Table 3. Rank order of States [1] in ratio of beds to population, for nursing homes and related facilities

State	Rank order number within each type of facility [2]				
	All facilities combined	Skilled nursing homes	Personal care homes with skilled nursing	Personal care homes without skilled nursing	Sheltered homes
Arizona	24	26	16	14	*27*
Arkansas	30	17	28	*30*	17
California	18	11	24	[3]	3
Colorado	16	9	13	21	9
Connecticut	3	5	9	9	5
District of Columbia	15	21	3	19	10
Florida	26	25	19	16	19
Idaho	22	28	6	17	*27*
Illinois	8	7	18	27	6
Indiana	14	16	10	8	*27*
Iowa	2	3	26	10	1
Kansas	11	27	23	3	8
Louisiana	28	18	25	22	20
Maine	5	2	27	12	4
Massachusetts	4	4	17	4	*27*
Michigan	20	6	*30*	28	13
Minnesota	12	8	5	23	*27*
Montana	19	20	12	11	18
Nebraska	6	22	21	1	21
New Hampshire	1	1	1	5	2
New Mexico	27	15	*30*	26	12
North Carolina	25	31	20	13	*27*
North Dakota	10	23	11	2	*27*
Oklahoma	23	12	14	24	*27*
Rhode Island	9	13	8	7	*27*
South Dakota	17	30	15	6	16
Tennessee	29	24	*30*	18	14
Wisconsin	7	10	2	15	11
Wyoming	21	19	7	20	15
Alaska	32	*32*	*30*	*30*	*27*
Hawaii	13	14	4	25	7
Puerto Rico	31	29	22	*30*	*27*

[1] Includes only 32 States which reported all 4 types of facilities.

[2] Number "1" assigned to State with highest ratio of beds of given type relative to its population. States with no beds of given type take the end-ranking number, shown in italics. The end number is shared when several States have no beds of the given type, the number assigned in such cases being the midpoint of the remaining numbers in the ranking series.

[3] Some unknown number of this type of facility are included with sheltered homes for lack of precise information on level of service.

of facilities, placing higher in some and lower in others.

5. Among this majority of 20 States which reveal a counterbalancing of ranks, there are no dominant patterns as among the types of facilities; each type is about as frequently represented as the others in high ranking and in low ranking among the States. For example, Michigan ranks high in skilled nursing homes, low in personal care homes. Kansas ranks low in skilled nursing homes and in personal care homes with skilled nursing, but high in the more distinctly domiciliary types of facilities. Nebraska, standing low in all the other types of facilities, ranks highest among the States in personal care homes without skilled nursing.

The variety of compensatory patterns of supply of the different types of facilities suggests that the relative unavailability of certain types may be in a sense merely a consequence of the availability of other types. Or, to put it more bluntly, the supply of the different types relative to each other may be quite "accidental." Whether the several levels of facilities are appropriately and soundly balanced to meet the real need is a question which perhaps some of the States can answer affirmatively. But it is not likely to be so answered by most, in view of the widely opposing patterns of availability found among the States.

Determinations of what is an appropriate balance and what are proper levels of adequacy in these facilities will not be attempted until the data collected in the inventory have been mined more intensively. We will look particularly to an analysis of the local distribution of facilities to tell us on a functional level how that distribution is related to controlling factors.

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Commissioning of New Reserve Officers Started

The Public Health Service has completed preliminary arrangements for the expansion of the Commissioned Reserve Corps for service in national emergencies, and the appointment of new officers is under way. The expansion program was announced in the November 1954 issue of *Public Health Reports* by Surgeon General Leonard A. Scheele.

Dr. Scheele pointed out that in order to serve effectively in a major national emergency "public health forces of the country must be in a position not only to carry on necessary normal functions under abnormal conditions but to take on vital new responsibilities as well."

"In these circumstances," the Surgeon General said, "the present public health forces of the Nation will need substantial augmentation. Intensive action to control communicable diseases will become an immediate necessity. Essential public health services for displaced populations will have to be provided. Medical services in the Coast Guard will have to be expanded overnight."

In expanding the Commissioned Reserve, the Service has two fundamental objectives: effective emergency utilization of professional personnel with training and experience in public health and augmenting these forces with physicians and other professional people not normally working in the field of public health but whose services would be needed to meet expanded demands.

An officer of the emergency reserve, a recent memorandum to commissioned and civil service personnel throughout the Public Health Service stated, "would be called to active duty without his consent only in the event of a national emergency publicly recognized as requiring such action," and such an officer who was "already performing important health duties would not be called for service in another area unless the situation in that area clearly justified it."

This memorandum emphasized that officers in the emergency reserve may request active duty at any time and will be called by the Service if needed.

Considering the problem of protection against radiation hazards from a legal viewpoint, a lawyer outlines the functions of various Federal and State agencies in this field. He sees the problem as a mutual one of the agencies concerned.

Public Control of Radiation Emitters

By GERALD L. HUTTON, LL.B.

SHORTLY after the discovery of X-ray and the isolation of radium at the turn of the century, radiation was found to be a useful research tool and to offer promises of high utility in the fields of medicine and industry. The potentially harmful properties of X-rays and naturally occurring radioactive materials, such as radium and thorium, were also recognized at an early date. Pierre Curie, H. Becquerel, E. Grubbe, and other scientists reported cases of dermatitis, epilation, and other types of damage from X-rays and injuries traceable to radiation from radium prior to 1900.

Nevertheless, as X-rays were used in World War I for industrial radiographic purposes, only minimal precautions were observed in many instances. The equipment itself did not possess the safety features found on modern X-ray units. During the early 1920's occurred the radium poisoning cases in which a number of girls engaged in painting watch dials apparently ingested pernicious quantities of radium. Reportedly, at least 20 of a total of 800 employees died during subsequent years with symptoms strongly suggestive of radium necrosis or radium-induced tumors. During this same period radium was found to be a useful external and interstitial source of radiation in therapy. Radium was also injected into patients for a variety of ailments ranging from arthritis to gout, and radium water was advertised and sold as a tonic and a rejuvenator.

As early as 1913, the National Bureau of Standards undertook the standardization of radium for medical uses, and in 1929 it sponsored the formation of the Advisory Committee on X-ray and Radium Protection. This committee, the name of which was later changed to the National Committee on Radiation Protection, has prepared a number of handbooks dealing with means of protection against the harmful effects of radiation. They cover such subjects as the safe handling of radioisotopes, control and removal of radioactive contamination in laboratories, maximum permissible concentrations in air and water, and disposal of

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Mr. Hutton, a licensed attorney in Tennessee, has been administrative officer for the Isotopes Division, Atomic Energy Commission, Oak Ridge, Tenn., since 1951. Any opinions expressed in this paper are those of Mr. Hutton and do not necessarily reflect the views of the commission or its general counsel.

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radioactive wastes. The committee is comprised of representatives from such organizations as the Atomic Energy Commission, the Public Health Service, the National Bureau of Standards, the American Medical Association, the Radiological Society of North America, the American Radium Society, and the National Electrical Manufacturers Association. Its recommendations are accepted as reliable and authoritative, and they are the basis for many of the present radiological safety procedures.

With the development of the atomic energy program after 1942, the need for increased attention to the hazards of radiation became apparent. Today, not only substantial amounts of naturally occurring radioisotopes, such as radium and polonium, and approximately 125,000 X-ray units (*1*), but also relatively large quantities of reactor-produced radioisotopes, made available through this program, are in use in medicine, industry, and research. From August 1946, when distribution was begun, through May 1954, the Atomic Energy Commission distributed reactor-produced radioisotopes to over 2,000 medical institutions, physicians, colleges, universities, industrial firms, Federal and State laboratories, foundations, and institutes (*2*). (The actual number of persons currently using radioisotopes is considerably greater than this figure, inasmuch as an institutional program usually includes several persons qualified to handle radioisotopes.) Users of these materials are found in every State, but the greatest number, in order of decreasing representation, are in New York, California, Pennsylvania, Illinois, Ohio, Massachusetts, Texas, New Jersey, Michigan, and Maryland.

The problem of protection against the hazards asssociated with radioactive materials, both those occurring naturally and those produced artificially, and radiation-generating devices can best be met through the cooperation of the several Federal and State agencies concerned with the protection of the health of the public. The following presentation outlines the functions of each of these agencies in assuring that radiation emitters are handled in a safe manner and indicates how they are interrelated.

AEC's Authority and Functions

In the Atomic Energy Act of 1946, the Atomic Energy Commission was authorized to distribute, in accordance with certain general provisions, the byproduct materials (radioisotopes) resulting from operation of nuclear reactors and to establish radiological health safety standards governing the possession and use of these materials. The commission's authority in this regard was expressed with greater precision and clarity in the Atomic Energy Act of 1954. Section 81 of the act provides as follows:

> No person may transfer or receive in interstate commerce, manufacture, produce, transfer, acquire, own, possess, import, or export any byproduct material, except to the extent authorized by this section or by section 82. The Commission is authorized to issue general or specific licenses to applicants seeking to use byproduct material for research or development purposes, for medical therapy, industrial uses, agricultural uses, or such other useful applications as may be developed. The Commission may distribute, sell, loan, or lease such byproduct material as it owns to licensees with or without charge . . . Licensees of the Commission may distribute byproduct material only to applicants therefor who are licensed by the Commission to receive such byproduct material. The Commission shall not permit the distribution of any byproduct material to any licensee, and shall recall or order the recall of any distributed material from any licensee, who is not equipped to observe or who fails to observe such safety standards to protect health as may be established by the Commission or who uses such material in violation of law or regulation of the Commission or in a manner other than as disclosed in the application therefor or approved by the Commission. The Commission is authorized to establish classes of byproduct material and to exempt certain classes or quantities of material or kinds of uses or users from the requirements for a license set forth in this section when it makes a finding that the exemption of such classes or quantities of such material or such kinds of uses or users will not constitute an unreasonable risk to the common defense and security and to the health and safety of the public.

Section 161 (b) authorizes the commission to:

> Establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property.

Distribution Regulations

The Federal regulations governing distribution of AEC-controlled radioisotopes are published in the Federal Register and appear also in the Code of Federal Regulations, 1953 supplement, title 10, chapter 1, part 30. These regulations set forth the application procedure for obtaining the radioisotopes and limit procurement, possession, and use of the materials, except exempted quantities, to persons holding a valid authorization (license) from the commission.

Exempt from the requirements concerning procurement, possession, and use of radioisotopes are 1 microcurie or less of beta and/or gamma emitters with half lives greater than 30 days and 10 microcuries or less of beta and/or gamma emitters with half lives no greater than 30 days. These quantities, however, may not be combined or otherwise altered or treated so as to increase the rate of radiation exposure above the original radiation intensity, nor may they be used for medical purposes except upon authorization of the commission. In addition, the commission may exempt specific items, upon application for exemption, from any or all of the regulatory requirements.

All persons desiring to procure radioisotopes, other than the exempted quantities, produced in or distributed by or through AEC facilities, produced in any nuclear reactor within the United States, or produced in foreign nuclear reactors for shipment into the United States must file an application for radioisotope procurement, form AEC–313, with the AEC's Isotopes Division, Oak Ridge, Tenn. The technical staff of the Isotopes Division reviews the application to determine if the applicant is equipped to use the requested radioisotope as outlined in the proposed use in a manner that will not endanger health and safety. This review entails an analysis of the applicant's experience and training, facilities, equipment, and radiological safety procedures. Applications involving novel or relatively abstruse medical uses are referred to the AEC's medical advisers for evaluation and recommendation.

If a review of the application indicates that the applicant has the facilities and qualifications necessary to use the requested material in a safe manner, an authorization for radioisotope procurement is issued to the applicant authorizing him to procure, possess, and use the specific type and quantity of radioisotope for which he has applied. If an applicant does not possess sufficient experience in the use of radioactive materials, he is requested to obtain such experience or associate himself with a person possessing the requisite experience and training. If facilities, equipment, or safety procedures are inadequate, the deficiency must be corrected before an authorization is issued.

Each person possessing or using radioisotopes must keep permanent records showing the receipt, use, storage, delivery, and disposal of radioisotopes, and the safety procedures to protect health. These records must be made available to the commission upon request. Such persons must also permit the commission at all reasonable times to make inspections of facilities where radioisotopes are stored or used.

If the commission at any time finds that a person is not equipped to observe or has failed to observe health safety standards established by the commission, or has used the radioisotopes in a manner other than as stated in his application, or has used the radioisotope in violation of law or any regulation of the commission, the commission may withhold or recall radioisotopes from such person.

Visitation Program

In accordance with the regulation concerning inspections, the Isotopes Division of AEC maintains a staff of technical specialists who visit institutions possessing radioactive materials. They note and evaluate such items as availability of handling equipment; adequacy of laboratory facilities, shielding, ventilation, and storage; radioisotope handling procedures; monitoring instruments and procedures; posting of caution signs; and labeling and waste disposal procedures. They advise on means of improving radiological safety procedures when improvement is indicated.

More than 500 institutions and individual radioisotope users are visited annually by AEC representatives. The visitation program is constantly expanding to meet the problems created by increasing use of radioisotopes. Selection

of institutions to be inspected is usually dependent on amounts and types of radioisotopes which the user has received. As a rule, those institutions which possess large quantities of long-lived radioisotopes, such as strontium-90 and cobalt-60, are visited more frequently than users having only limited amounts of short half-life or low-energy emitters.

These visits to radioisotope users are not only instrumental in improving radiological safety procedures, but they also provide information of value in reviewing future applications from the user. The visits also keep the AEC Isotopes Division informed on specific problems facing radioisotope users in their day-to-day operations.

Cooperation With States

A copy of each authorization issued to users within a certain State is forwarded to the State health agency or other State office charged with the responsibility of protecting the health of the State populace. When time and travel schedules permit, AEC representatives routinely invite State personnel to accompany them on visits to radioisotope users. In addition, State personnel make independent visits and followup inspections to assure that recommendations are being followed and that undesirable conditions have been corrected. Information resulting from such visits by State representatives is frequently forwarded to the Isotopes Division, particularly when the inspection is a followup to a joint AEC-State visit.

Since State health agencies are kept currently informed of the type and quantity of radioisotopes allocated to persons within their jurisdiction, it is possible for them to concentrate on those users possessing substantial amounts of radioactive materials. It is believed that the increasing cooperation between the State and Federal Governments in discharging their respective obligations is highly effective in maintaining high standards of radiological health safety in the radioisotope-distribution program.

AEC Safety Standards

Recognizing that radiological safety standards could be more easily adapted to the changing concepts of radiological safety if they were established by regulation or administrative order rather than by statute, Congress delegated to the AEC the authority to establish safety standards relative to the handling of AEC-controlled radioisotopes. Under this authority, the AEC may publish health safety standards having general application and also may issue specific instructions applicable to a situation not covered adequately by the general regulations.

AEC is in the process of developing standards governing the manufacture, testing, and labeling of sealed sources containing radioactive materials and radiological health safety standards of general application. In addition, the director of the Isotopes Division is authorized to establish for individual users safety standards and instructions governing the possession and use of AEC-distributed radioisotopes. He is also empowered to issue an order requiring immediate correction of any unsatisfactory conditions or procedures involving the use of such radioisotopes.

In furthering radiological health safety, the AEC Isotopes Division relies heavily on education. Through correspondence with radioisotope users, speeches, on-the-job visits, and the quarterly publication *Isotopics* and other publications, the division attempts to keep users currently informed of accepted safe practices. As a result of these efforts, not only have unsafe practices been corrected, but in many instances unduly restrictive safety programs have been reorganized so that greater emphasis is placed on their most important features. Such reorganization frequently has resulted in an improved radiological safety program at less expense to the company.

In only a few instances has the AEC found it necessary to issue formalized safety instructions in order to effect correction of unsatisfactory conditions. The majority of the users voluntarily attempt to keep radiation exposure at the lowest rate possible and well within the limits recommended by the National Committee on Radiation Protection. Some industrial users, however, have expressed a desire for definitive radiological health safety regulations having the force of law. These requests, for the most part, are based on the desire to know the

rules within which they must operate and a wish to avoid the mistakes and growing pains which attended the early use of radium and X-ray.

It is unlikely that any enterprise involving potentially hazardous materials can continue to operate successfully without specific safety rules. Experience of such agencies as the Food and Drug Administration and the Federal Trade Commission indicates that an agency cannot expect 100 percent unqualified voluntary compliance with accepted minimum safety standards and procedures. Therefore, for the proper administration of the AEC isotopes program, regulations and laws appear to be essential. It is to be noted, however, that a unanimity of opinion does not exist on this point, some persons believing that laws and regulations are not necessary and, in general, are objectionable. A portion of this group acknowledges the necessity for some degree of legal control but wishes to avoid unrealistic or ill-advised legislation.

Carefully drawn health safety regulations, aside from their regulatory aspects, could prove of inestimable value from an information point of view. It is true that a wealth of information exists today in the form of recommendations and standards set forth in the various handbooks of the National Bureau of Standards and in numerous publications of the Atomic Energy Commission, the Public Health Service, and other sources, but this information is not in the form of regulations or laws and therefore does not provide a binding norm. The recommendations prescribe safe handling procedures that may be possibly desirable, definitely desirable, or necessary. Consequently, the average individual may experience difficulty in ascertaining what is required of him in his own particular operation. Regulations consistent with current technical knowledge of radiation hazards and subject to modification as more knowledge is obtained could set forth in concise fashion the basic essential requirements.

Other Federal Agencies

Radioactive materials shipped in interstate commerce must be packed and labeled in accordance with regulations of the Interstate Commerce Commission. These regulations are applicable to radioisotopes produced in nuclear reactors or cyclotrons and those occurring naturally. Civil air regulations also affect the transportation of radioisotopes. Radioisotopes intended for drug use fall within regulations issued under the Federal Food, Drug, and Cosmetic Act. A shipment in interstate commerce must be labeled in accordance with the regulations of the Food and Drug Administration. An ad hoc committee comprised of representatives of the Atomic Energy Commission and the Food and Drug Administration studies and advises on problems of mutual interest.

At present, radioactive materials that are exempt from the packing and labeling requirements specified in the ICC regulations may be admitted to the United States mails if packed and labeled in accordance with specifications set forth in the Postal Regulations. In 1936, after receiving complaints that photographic films were being fogged by being placed in proximity to packages containing radium or other radioactive materials, postal authorities issued an order which read, in part, ". . . any radioactive materials, including radium, thorium, or other radioactive substance, or any materials containing radioactive substance, such as powders containing radium or thorium, liquids containing radium emanation, radium salts, or radioactive minerals is prohibited transmission in the mails . . ." This order, of course, failed to take into account that radium and thorium in minute quantities are present in all materials. It was later revoked in favor of a more realistic rule.

Obligated by law to protect and to improve the health of the Nation's populace, the Public Health Service has been actively engaged in radiological health activities for a number of years. It has cooperated with the Atomic Energy Commission and its contractors in studies of such problems as the decontamination of radioactively contaminated waters; the treatment of radioactive wastes and methods of waste disposal for the predicted nuclear power reactor program; and evaluation of the varying degrees of hazards associated with the many radioactive elements formed as a result of nuclear reactions. The Service has also conducted nationwide surveys to determine the dangers associated with many varieties of radi-

ation emitters, such as particle accelerators, X-ray units, and fluoroscopic devices, and has made the information available to persons concerned with radiation problems. At present, the agency is encouraging the development of State radiological health programs.

As part of the Public Health Service's liaison and educational activities, the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio, offers the opportunity for State and local health personnel to acquire basic knowledge regarding radiological health and safety problems. The center offers courses in basic theory of radiation, radiation detection instrumentation, the biological effects of radiation, and methods of protection against radiation.

States' Duties and Functions

The several States as sovereign powers have the authority, and duty, to protect the health of their citizenry. This authority is based upon the police powers inherent in all sovereigns and covers such items as handling and sale of drugs, preparation and sale of foods, regulation of sanitary conditions of buildings and industry, purity of water supplies, disposal of sewage and garbage, and protection of the health of employees. Statutes and regulations based upon the police power and designed to protect the health of the public are common today, and in most instances they have been held valid by the various courts. It is a cardinal principle of law, however, that exercise of the police power must be reasonable. Further, it must not violate provisions of the Federal Constitution or the State constitution.

Almost all States have statutes which could affect the use, transportation, storage, and disposal of radioactive materials.* It is common, for example, to find statutes prohibiting the pollution of streams. Usually such legislation authorizes the State health department or a special board, such as a stream pollution board, to carry out the purpose and intent of the statute involved, to promulgate regulations, and to modify or amend them, as may be necessary.

A number of the State agencies have made remarkable progress during the past 2 years in developing programs and in acquiring competent personnel to further radiological health within their respective jurisdictions. Some agencies, however, have failed to exercise their authority, and in some instances funds have not been made available to them.

Proposed Action

During the past year, a number of States have prepared preliminary drafts of standards and regulations applicable to the use of radioactive materials and radiation-generating devices. Generally, these proposed drafts have included provisions whereby special boards or State health groups would prepare rules and have authority to amend them as necessary. These drafts would indicate that the States do not contemplate including specific detailed tolerance and contamination values in statutes. This approach, of course, is desirable inasmuch as statutes often are difficult to amend, usually requiring action by the State legislatures, whereas codes or regulations established by administrative agencies can be readily amended by action of the agency. Control by administrative regulations has two advantages: If a situation not previously contemplated should develop, a rule may be established and put into effect with a minimum of delay; if an unreasonable or unduly stringent rule should be published, this rule may be relaxed with a minimum of delay.

Care should be exercised to assure that such regulations are realistic and that they place the emphasis on those conditions or practices which present a real problem as opposed to a theoretical one. A preliminary draft of one proposed State regulation defines a radiation hazard in such a manner that, if the definition were interpreted literally, a radiation hazard would exist if one wore a luminous dial watch or worked with infinitesimal quantities of radioactive materials. Inasmuch as all persons are exposed to radiation from naturally occurring radioisotopes in the soil and from cosmic radiation, it could be concluded from this definition that all human beings on this planet are subject to radiation hazards at all times.

The maximum permissible concentration of radioactivity in air, in another proposal, would be 1×10^{-7} μc./ml. for beta-gamma emitters. This value is unduly stringent for some radioisotopes and much too liberal for others. The

National Committee on Radiation Protection, for example, would permit 2 x 10^{-5} μc./ml. for tritium (hydrogen-3) and 2 x 10^{-10} μc./ml. for strontium-90 and yttrium-90 for radiation workers. The proposed regulation would permit an air contamination of strontium-90 that is 500 times the amount recommended as a maximum permissible level by the committee. With the exception of radium and perhaps polonium-210, strontium-90 is possibly the most dangerous radioactive material in general use today.

These points are noted, not in a sense of adverse criticism, but to point up the fact that regulations should be drawn with care and with a thorough realization that they must be practicable and reasonable. This is not easy, admittedly, when dealing with a relatively new and complex subject. The National Committee on Radiation Protection is currently engaged in a study of the desirability of State legislation, problems associated therewith, and possible solutions.

Bases for Sound Programs

The basic tenet of a radiological health program should be that radiation can be used safely if proper precautionary measures are followed. Hospitals, laboratories, industrial firms, universities, and other institutions should be encouraged to employ persons trained in accepted measures of protecting against radiological hazards. They should be encouraged to continue the practice of employing and delegating responsibility to a radiological safety officer.

The State program should be based on actual needs rather than remote theoretical possibility. In all probability, at this time a greater number of people are exposed to excessive radiation from shoe-fitting machines, inspectoscopes, fluoroscopes, X-ray units, and similar devices than from radioactive materials. In any event a program could be initiated on a rather modest scale and could include monitoring of X-ray operations to determine the amount of exposure to which operating personnel and other individuals are exposed. As experience is obtained, the program could be extended.

As previously mentioned, AEC is presently working on radiation safety standards applicable to AEC-controlled radioisotopes. It is possible that State groups might find it desirable to refrain from enacting a stringent set of regulations until these have been published. Their use as guides by the States should help in achieving a greater degree of practicability and uniformity.

Summary

In the final analysis the control of potential radiation hazards is a problem which can best be solved in all of its various facets by cooperation among the various Federal agencies and State groups charged with public health responsibilities.

The Atomic Energy Commission licenses users of reactor-produced radioisotopes and other radioisotopes subject to its jurisdiction before such users are permitted to receive the materials. This application must include information as to the laboratory facilities available, monitoring and survey instruments on hand or immediately available, the training and experience of the individual who will be responsible for use of the material, the amounts and types of materials which will be in use during a particular operation, storage containers, radiological safety procedures, and other information useful in evaluating the safety problems which may be encountered.

The Atomic Energy Commission is authorized to establish regulations, having the force of law, violation of which may subject the offender to fine or imprisonment. In addition, since the commission controls the supply of reactor-produced radioisotopes, an effective deterrent to violation of established safety rules and procedures is the fact that the commission may withhold further shipments of the materials or recall those already distributed.

Other Federal agencies control the transportation of radioactive materials in interstate commerce and such applications of radioactive materials as the inclusion of them in food or drugs. The Public Health Service is engaged in studies of radiation problems and is encouraging the development of State radiation health programs.

State health personnel make joint inspections with AEC representatives and conduct independent inspections of users of AEC-controlled radioisotopes. They also visit X-ray installa-

tions and users of naturally occurring radioisotopes. Although some State agencies have failed to exercise to the fullest extent the powers invested in them, others have made remarkable progress in recent years in acquiring competent personnel and developing effective inspection and educational programs in the field of radiological health safety.

Despite the increasing availability and use of radioactive materials, the radiological health picture in the United States is good. It is believed that continued cooperation among all agencies involved, whether Federal, State, or local, is the best insurance that this picture will continue to be good. The abuses and misuses associated with the early use of radium and the overexposures to operating personnel from X-ray units, fluoroscopes, and other radiation-generating devices can be avoided. Caution, even extreme conservativeness, has been the keynote in the development of atomic energy. Fortunately, this has been one field in which the public health controls have kept pace, and they can continue to do so, with the increasing scope and growth of the industry.

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Dial C for Cancer

The health education problem of providing information on cancer to the public without arousing anxieties and fears about being thought foolish or of embarrassing examinations or mutilating operations has been given an entirely new approach according to the British Medical Journal, October 2, 1954 (pp. 802, 807).

The Hull City Council in England put into operation "a remarkable scheme," according to the journal, in the hope that it will prove effective as a means of breaking down these fears. The scheme makes it possible for those who are too nervous or too uninformed to consult their own doctors simply to dial a number on their telephones for advice. A recording was made from a script prepared by medical authorities. Text of the record is now played when anyone in Hull dials the appropriate number. According to newspaper accounts, hundreds dialed the number during the first week. Results have not yet been determined.

Histoplasmin and Tuberculin Sensitivity

—Florida, 1954—

By JAMES O. BOND, M.D., and ERMA WHITLOCK, R.N.

IN the rapidly accumulating literature on the epidemiology of histoplasmosis, varying reports are given on the incidence of positive skin test reactors to histoplasmin in Florida. Christie and Peterson (*1*) tested 30 Florida residents in a survey of admissions to Vanderbilt Hospital and found 20 percent positive. Palmer (*2*) reported 4.3 percent positive in a group of 70 nurses tested in Florida during the course of a nationwide survey. Loosli and others (*3*) in their survey of University of Chicago students tested 109 from Florida and found 12.8 percent positive.

Since histoplasmosis was originally described as a tropical disease (*4*), it was felt that it would be of interest to obtain more accurate statistics on the incidence of exposure in Florida, which is perhaps the most nearly tropical State and serves as a portal of entry for many visitors and emigrants from the tropical countries of the Western Hemisphere.

Dr. Bond, health officer for Hardee, De Soto, and Charlotte Counties, Florida, is currently on leave of absence to study at the Johns Hopkins University. Miss Whitlock is the public health nurse for De Soto County.

Everett Williams, director of the bureau of vital statistics, and Dr. D. S. Doff of the bureau of tuberculosis control, Florida State Board of Health; and Dr. Frank E. Daves and staff of the Arcadia Branch of the Florida State Hospital assisted in the preparation of this report.

Methods

The group included in the present study consisted of 845 white patients in the Arcadia branch of the Florida State Hospital for the mentally ill. This is not an adequate sample from which accurate conclusions may be drawn regarding the general population of the State; however, it is offered as the best sample available to date. No disturbed patients or patients in the infirmary were subjected to the tests. An attempt was made to determine the length of residence of the subjects both in the State of Florida and in its respective counties. Individuals who have lived 50 percent or more of their lives in the State or a county were considered life-long residents. These criteria were arbitrary, there being no agreement among other investigators as to what constitutes life-long residence (*2–7*).

Since the population of Florida largely consists of migrants from other States, it was felt that less rigid criteria for permanent residence were needed for this study. However, individuals who had at any time lived in the endemic States of Tennessee, Arkansas, Kentucky, Missouri, Indiana, Illinois, Ohio, Kansas, Mississippi, or Louisiana were excluded insofar as statistics for Florida residents were concerned.

The testing procedure consisted of the intra-

dermal injection of 0.1 cc. of a 1:100 dilution of histoplasmin concentrate (A) on the volar surface of the arm. Simultaneously, the opposite arm was injected with a 0.1-cc. solution containing .0001 mg. of purified tuberculoprotein derivative (B) as prepared by the method of Seibert and Glenn. New syringes and platinum needles appropriately labeled and restricted to each antigen were used throughout. These tests were read in 72 hours and were defined as positive if there was an area of induration 5 mm. in diameter or more. All other reactions were called negative in this series. All tests were performed and read by the same two individuals. Analyses of the results for statistical significance were based on a 95-percent probability.

Results

The overall results are given in table 1. It can be seen that 11.7 percent of the total group reacted positively to histoplasmin. This is roughly the same as the 12.8 percent obtained by Loosli and associates (*3*), but it is higher than the 4.3 percent obtained by Palmer (*2*) and would place Florida in his region VI rather than region IX. However, this would not change Florida's position as on the periphery of the area of endemic histoplasmosis in the United States.

Of the 476 life-long residents of Florida in the total group, 8.0 percent were histoplasmin positive, whereas 16.5 percent of the nonresidents were positive. This is a statistically significant difference.

Of the total group, 54.4 percent reacted positively to intermediate strength tuberculin. The difference between the rates for Florida residents (52.9 percent) and that of the nonresidents (56.3 percent) is not significant. The incidence of tuberculosis infection in mental hospital patients is higher than that in the general population and would be expected to reflect in higher tuberculin positive rates. It will be the purpose of the authors to establish later the tuberculin positive conversion rates for this group and compare these rates with those in the general population and with other mental hospital groups.

Function of sex. Of the total male group 13.7 percent were histoplasmin positive compared with 9.6 percent of the females. In the life-long residents of Florida, these figures were: males, 10.6 percent and females, 5.1 percent (table 2). These differences are not statistically significant. Other investigators have found a similar slight sex difference with males usually higher. In the case of the tuberculin test, the percentage of reactors among males was also higher than among females. However, this difference was not statistically significant for the life-long residents.

Function of age. The highest percentage of positive histoplasmin reactors was found in the 30- to 40-age group of life-long Florida residents. This is similar to the findings in other States (*1*, *3*, *4*) where the incidence rose very rapidly in the preadolescent and adolescent groups then leveled out, reaching a gradual peak in the fourth decade. The lowest percentage in this study (2.6 percent) was in the 20- to 30-age group. Most reactors to tuberculin were found in the 50- to 60-age group, which corresponds with the results of other surveys.

Function of geography. Of the residents of northern Florida counties 8.5 percent developed a positive skin test to histoplasmin compared

Table 1. Reactors to histoplasmin and tuberculin skin test antigen, Florida State Hospital, Arcadia, Fla., 1954

Item	Total	Sex		Age group					Residence	
		Male	Female	20–29	30–39	40–49	50–59	60 and over	Florida	Non-Florida
Number tested	845	430	415	54	166	229	216	180	476	369
Histoplasmin reactors (percent)	11.7	13.7	9.6	9.2	13.2	10.0	13.8	10.5	8.0	16.5
Tuberculin reactors (percent)	54.4	60.9	47.7	40.7	53.0	51.9	59.2	54.4	52.9	56.3

Table 2. Histoplasmin and tuberculin rates for life-long Florida residents, 1954

Item	Total	Sex		Age group					Residence		
		Male	Female	20–29	30–39	40–49	50–59	60 and over	Northern	Central	Southern
Number tested	476	245	231	39	115	140	108	74	82	302	92
Histoplasmin reactors (percent)	8.0	10.6	5.1	2.6	11.3	5.0	9.2	9.4	8.5	6.9	10.8
Tuberculin reactors (percent)	52.9	56.3	49.3	43.5	45.2	55.7	58.3	50.0			

with 6.9 percent in central Florida and 10.8 percent in southern Florida. These differences are not statistically significant. Of 150 life-long residents of the Tampa Bay area 6.0 percent were positive compared with 68 residents of the Miami-Key West area of whom 13.2 percent reacted positively. Of the non-Florida residents 16.5 percent had a positive histoplasmin skin test, and 47.1 percent of these positive reactors came from endemic States of the Mississippi Valley basin.

Correlation with pulmonary calcification. A total of 711 of the 845 patients receiving skin tests had received 70-mm. X-rays the year previously during a mass survey. These were reviewed especially for evidence of pulmonary calcification by Dr. S. D. Doff of the Florida State Board of Health. The results as correlated with the skin tests are given in table 3. Of the single histoplasmin reactors 13.8 percent had pulmonary calcifications on X-ray compared with 4.8 percent of the single tuberculin reactors. This twofold difference, although of doubtful significance in this study, is similar to previous findings which have established the positive correlation found between pulmonary calcifications and positive histoplasmin tests.

Discussion

The results of this study conform to the results of previous investigations that place Florida on the periphery of the area of endemic asymptomatic histoplasmosis infection in the United States. We feel that this also lends weight to the theory that the disease is not spread by human contact. If the disease were so spread it would have been expected that Florida would have a higher incidence than a peripheral State since Florida has many migrants both from the tropics where rates of exposure are relatively high (*8*) and from the endemic areas in the United States.

That there was no significant change in the rates of positive histoplasmin reactors in northern, central, and southern Florida was of some interest. Since south Florida is from 300 to 500 miles farther distant from the Mississippi Valley basin than northwest Florida it might be expected to have a lower rate, but our evidence shows there is no significant decrease of the rate in south Florida. It should be remembered, of course, that the evidence we have presented is insufficient to definitely establish this as a fact.

The significant difference between the histoplasmin rates for life-long Florida residents (8.0 percent) and nonresidents (16.5 percent) is thought to be due to the fact that approximately 50 percent of these nonresidents came

Table 3. Histoplasmin and tuberculin reactors with pulmonary calcifications, Florida State Hospital, Arcadia, Fla., 1953

Item	Total	Reactors			Nonreactors
		Histoplasmin	Tuberculin	Histoplasmin and tuberculin	
Number tested	711	29	309	33	340
Calcification on X-ray:					
Number	29	4	15	2	8
Percent	4.0	13.8	4.8	6.0	2.06

from States having a high rate of histoplasmin positive reactors.

Summary and Conclusions

Eight hundred forty-five white patients in a hospital for the mentally ill in central Florida were given histoplasmin and tuberculin skin tests. Of the number 11.7 percent were histoplasmin positive and 54.4 percent were tuberculin positive. Of the 476 life-long residents of Florida in this group, 8.0 percent were histoplasmin positive and 52.9 percent, tuberculin positive.

These residents of Florida are thus shown to be on the periphery of the area of endemic histoplasmosis in the United States. There was no significant difference in the histoplasmin positive rates found for groups of individuals who had lived in either northern, central, or southern Florida 50 percent of their lives.

Movement of individuals from the areas of endemic histoplasmosis into Florida and the varying distances of residents in northern and southern Florida from the Mississippi Valley basin have not influenced the histoplasmin positive rates.

EQUIPMENT REFERENCES

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(B) PPD tuberculin tablets, intermediate strength, Sharpe & Dohme, West Point, Pa.

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PHS Advisory Council Appointment

Dr. Eugene Anson Stead, Jr., has been appointed by the Surgeon General of the Public Health Service to serve on the National Advisory Arthritis and Metabolic Diseases Council. Dr. Stead will advise and make recommendations to the Surgeon General and to the director of the National Institute of Arthritis and Metabolic Diseases on the extramural activities of the institute. A professor of medicine at Duke University School of Medicine since 1947, Dr. Stead is also physician-in-chief of Duke Hospital, Durham, N. C. His prior associations during 1942–46 include serving as instructor and associate professor at Harvard Medical School, professor and dean, Emory School of Medicine, and physician-in-chief, university division, Grady Hospital. Dr. Stead obtained his medical degree at Emory University.

"What We Did and How We Did It"

A summary of 10 reports presented at the sixth annual meeting of the Kentucky Public Health Association

TYPICAL of the day-to-day public health work in any community are the projects described in a series of informal reports presented by personnel from local health departments at a session of the 1954 Kentucky Public Health Association meeting, which was held in Louisville, May 19–21. Although not necessarily unique, these projects are worthy of note, for they are illustrative of what is being done in public health at the local level and, perhaps more important, of how it is being done. The projects range from raising funds for new health department buildings to conducting a mass blood-testing survey, from promoting the purchase of a new garbage truck to encouraging mothers to see that their children receive immunizations. Significantly, in every one of the projects, the key to success was citizen participation.

The series of reports is summarized here, with the thought that they may provide encouragement for other local public health workers facing similar problems. Moderator of the session was Sara C. Stice, director of public health education, Kentucky State Department of Health. Speakers on the program were:

Harry Barry, sanitarian, Ballard, Carlisle, Fulton, and Hickman County Health Departments.

M. V. Clark, administrator, Floyd County Health Department.

Thomas Goodin, sanitarian, Bell County Health Department.

Elizabeth Herman, nurse, Mercer County Health Department.

E. A. King, M.D., health officer, Harlan County Health Department.

George McKenzie, administrator, Garrard County Health Department.

Robert Mundy, sanitarian, Christian County Health Department.

Josephine Prewitt, clerk, Henry County Health Department.

Abbie Ricks, clerk, Trigg County Health Department.

Edwina Roberts, nurse, Henderson County Health Department.

Floyd County

A recent mass blood-testing survey in Floyd County not only demonstrated that the county still has a syphilis control problem, but also showed what can be accomplished through public health education and good public relations, according to the report from the county health department's administrator. In a period of 12 working days, 4,200 persons, about one-twelfth of the county's population, were given blood tests. Thirty-two of the tests were positive, at least 20 of which were believed to represent cases of congenital syphilis.

The program was focused on seniors in the public high schools and was publicized as blood-

testing for syphilis with emphasis on congenital syphilis. It was made known, however, that the service was available to anyone in the county. Centering the program around the schools was considered the best way to encourage the public to take advantage of it. Actually, about 20 percent of the persons tested were not associated with the schools.

An intensive publicity campaign brought the program to the attention of the people. The weekly newspaper carried a streamer reading "Get a free blood test—see article below" and a front-page article during the week before and the first week of the survey. The local radio station broadcast a 15-minute recorded program and frequent spot announcements each day, giving the location of the mobile unit and urging the people to get a free blood test. A short film advertising the program was shown during intermission at the local drive-in theater. Through the efforts of the local physicians, milk companies, bread companies, wholesale grocers, and school officials, 20,000 handbills were distributed. During the week prior to the survey, a film and a talk on syphilis were presented to the school children, and the evening before the mobile unit was to visit a particular school, each child was given a handbill to take home to his parents.

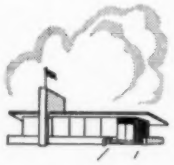
Despite the success of the survey in terms of numbers of blood tests made and the splendid cooperation of many persons, it was felt that it perhaps failed to reach those who most needed to be reached. Children were heard to say, "My mother told me that she would whip me if I took a blood test," and it was believed that this was the attitude of many parents who were afraid their children might show a positive reaction.

Mercer County

SOON after its formation in 1950, the citizens health committee in Mercer County proved its value by helping the county health department secure funds to continue operation. A mass meeting of the committee with representatives from each of the civic organizations in the county resulted in substantial increase in the appropriations from all the contributing agencies. At present, the committee is working on plans for a new health center. It has had speakers at meetings of all the civic clubs and has held a mass meeting to make plans for financing the project.

The Mercer County Health Department has received assistance in its maternal and child health program from another community group, the county homemakers club. Members of the club first made a survey to locate infants and preschool children who had not received immunizations. Then they visited the homes of these children, some of them in remote parts of the county, and invited the parents to bring the children to the clinics. They furnished transportation in many instances, and they assisted the clinic staff with recordkeeping.

Fulton County



How funds were raised to build two new health centers was the project reported from Fulton County. Unable to obtain State funds to convert an unused school building into a health center, the health department decided to consider other means of accomplishing its objective. The board of health was asked to approve the building of new health centers, and the chairman of the board was selected to present the problem to the Chamber of Commerce in the town of Hickman and the Lions Club in the town of Fulton, Hickman and Fulton being the locations of Fulton County's two health department offices. Protests that the people had recently made large contributions to such projects as a factory, a ball park, and a swimming pool were raised, but the organizations agreed to see what could be done for the health department.

In Fulton, the Lions Club succeeded in raising about $4,000 among the townspeople and, with the assistance of all the other civic groups in the area, another $8,000 from the farmers. In Hickman, the Chamber of Commerce began its campaign with the farmers and succeeded in raising $12,000, made up largely of $200, $150, and $100 donations.

"If you and your county should undertake such a program, don't be discouraged by those

who tell you that it can't be done," the sanitarian declared. He pointed out that even if the money is not raised, the project will serve to bring the health department to the attention of the people.

Henry County

To gain the support of the people for health programs, the Henry County Health Department has enlisted the aid of several groups—the county medical society, the rural health council, the parent-teacher association council, churches, and civic clubs. The rural health council discusses health problems and handles most of the publicity. Citizen participation through these groups has been especially effective in three of the health programs—tuberculosis control, sanitation, and nutrition—the health department clerk reported.

This year, 1954, was deemed Henry County's most successful in publicizing the tuberculosis mobile X-ray unit. Newspaper publicity included articles; half-page advertisements giving, among other information, a list of people who could provide transportation; a letter signed by the secretary of the medical society urging the people of the county to take advantage of the service; a proclamation signed by the county judge; and a letter of gratitude from a tuberculosis patient discovered in the 1953 survey.

Whenever the health department calls a meeting of citizens to help with any of its programs, the clerk explained, the importance of the meeting is made clear by stressing the specific responsibility of each person invited. Letters are written about a week in advance, and phone calls are made the day of the meeting as a reminder.

Garrard County

THE speaker from the Garrard County Health Department emphasized the importance of the "little things" in attaining success in public health work. Cleaning up premises, building a sanitary privy, or connecting to the city sewer and water system is not an earth-shaking event, but it is the sort of thing which counts, he said.

He attributed the success the health department has had in increasing its operating funds during the last 4 years to the fact that the health department has let the people know what it is trying to do and, at the same time, has paid heed to what the people want. He recommended that an opportunity to talk to community groups, to publish articles in the newspaper, or to write a report never be missed.

The Garrard County representative suggested that public health workers meet with the courts, the city councils, and the school boards, not only when they are asking for additional appropriations but at other times too. He also urged that they visit with the mayor, the judge, the magistrates, the school superintendents, and members of the medical profession.

Trigg County

In Trigg County, improving child health was the initial concern of the recently organized citizens health committee. Three projects in this field were selected: a survey of the immunization status of all children under 3 years of age; contacting mothers of 3-month old infants to encourage them to take their children to the family doctor or the health department for immunizations; and organization of well-baby clinics. Committee members took over the responsibility of sending out mimeographed letters to mothers, and they visited each home from which the letter was not returned. They also helped to promote "Immunization Week."

Physicians have reported that several mothers brought their infants for immunizations as a result of the notices sent out by the committee, the health department clerk, who spoke for her agency, stated. She also noted that the work done so far by the citizens health committee has helped it to recognize other existing health problems and to realize that the problems are the people's problems, not just jobs for the health department. One committee mem-

ber has mentioned possible sanitary problems in school cafeterias, and another has suggested a dental health program, she said.

Christian County

In Christian County the health department initiated and supervised an antirabic vaccination program, but it was the civic clubs, other organizations, and individuals of the communities who put the program over.

The Civitan Club of Hopkinsville was the first group to become interested in the program. As soon as a tentative schedule for the campaign was set up, the four local soft drink bottling companies offered to finance the printing of posters announcing the program. The senior class of Hopkinsville High School helped with the publicity and assisted when the campaign got underway by helping to fill out the vaccination forms. Four local veterinarians assisted in planning and carrying out the program.

The planning of newspaper and radio publicity began weeks in advance. Articles were submitted to the newspaper, and one day the program made the headlines. The newspaper also carried the daily schedule on the front page. During the week of the campaign, the local radio station broadcast three times a day a program recorded by the health department staff.

Emphasizing the importance of sound public relations in putting over any kind of health department program, the speaker from the Christian County Health Department urged public health workers to establish contacts with the leaders of the community. He felt that access to a radio station is of prime importance for a health department, and he considered the possession of a tape recorder "ideal."

Bell County

GETTING the mayor and the city council of Pineville in Bell County to pass an ordinance for the purchase of a new garbage truck, one with the capacity to carry a mechanical bed, began with the assembling of data on the garbage collecting practices. The Bell County Health Department sanitarian, who described this project, counted the number of stops the garbage truck made and the number of homes that did not have approved garbage cans. He showed the amount of time wasted in loading and unloading the truck and the number of unnecessary trips to and from the garbage dump.

The data were then presented to the people through reports in the local newspapers and the health department's weekly radio program. To get the key people of the community interested, a letter was sent to each of the 12 civic clubs in the Pineville area, explaining the project and asking them for their recommendation and approval. All the clubs voted to support the project, and, with the clubs' endorsements and the survey data, the health department sanitarian proposed the project to the city council.

Harlan County

Not organized until April 1954, the advisory health council in Harlan County has already begun work on two projects: cleaning up roadsides, towns, and thickly settled communities, and a method for determining whether or not children are receiving the proper immunizations. For the first project, subcouncils, each composed of about 20 persons, have been organized in 5 communities to promote and carry out the work. For the second, a double postcard will be sent to every mother 6 months after the birth of her child, one-half of the card providing information on the type of immunizations the child needs and how to get them, the other half to be filled out and returned by the family physician. If no reply is received within a reasonable time, a public health nurse will visit the homes. The council, composed of 18 persons, includes representatives from ministerial associations and civic organizations, members of the boards of education, city and county officials, physicians, and businessmen.

Henderson County

THE citizens health committee in Henderson County, soon after its reorganization in the summer of 1952, began work on three public health problems: sewage disposal, nutrition, and child health. Its first action was the formation of a special committee on each of these problems to collect facts and to plan ways of presenting them to the public.

A year and a half's work on the sewage disposal problem—Henderson, as well as other cities along the Ohio River, had been notified to take steps to prevent dumping of raw sewage into the river—has resulted in plans to build a sewage disposal plant which will cost an estimated $3 million. To obtain this result, the sewage disposal committee began by presenting a program on the subject to civic clubs and other organizations.

The nutrition committee began its work with a preliminary 1-day diet survey, in which 288 children in the city and county schools participated. There followed a study of nutrition in two of the public schools. In January 1953 and again before the end of the school term, 3-day diet surveys were made, each child was weighed and measured, and hemoglobin determinations were done. On the first examination, many of the children showed a hemoglobin so low that the physicians working with the committee recommended giving them iron pills. On the second examination, several of the children showed an increase in hemoglobin and all had gained weight. This year the study is being repeated in the same schools.

The interest in nutrition stimulated by this study is exemplified by the request from the county superintendent of schools that a workshop be held for all workers in the school lunchrooms. The nutrition program has also served to show up another health problem in the county, namely, intestinal parasites. The medical representatives on the committee are currently gathering facts on this problem.

Toward improvement of child health, the committee's work has resulted in the organization of child health clinics at two housing projects. At these clinics, women of the community serve as hostesses and take heights and weights of the patients.

Lewis Ryers Thompson

Dr. Lewis Ryers Thompson, former Assistant Surgeon General of the Public Health Service, died at the Public Health Service Hospital in Baltimore, November 12, 1954, at the age of 71. Among the most notable of his achievements was the organization of the National Institutes of Health, of which he was director from 1937 to 1942.

A career officer in the Service for 36 years, Dr. Thompson served in all ranks. He was appointed Assistant Surgeon General in 1930, a position he held for 16 years. At the time of his retirement, November 1, 1946, he was chief of the Bureau of State Services.

Dr. Thompson also served as scientific director of the international health division, Rockefeller Foundation, and as a member of the division of medical sciences of the National Research Council. He was chief of the medical division of the United States Strategic Bombing Survey in Japan in 1945 and 1946, Gilman Thompson lecturer at the University of Cornell, and De Lamar lecturer at Johns Hopkins University. He is survived by his wife, son, and daughter, who reside at 3917 Virgilia Street, Chevy Chase, Md. Burial was in Arlington National Cemetery.

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Occurrence of Influenza, July 1953 to June 1954

By Dorland J. Davis, M.D.

INVESTIGATORS and diagnostic laboratories located in universities, hospitals, and Federal and State agencies, including Army, Navy, and Air Force installations, have collaborated since 1948 in reporting the occurrence of specifically diagnosed influenza as a part of the World Health Organization Influenza Study Program in the United States. These communications are summarized weekly in the Communicable Disease Summary of the National Office of Vital Statistics, Public Health Service, and are also distributed to health officials and interested research workers in the United States and other countries, and to the headquarters of the World Health Organization in Geneva. The program, operating on a worldwide basis, also facilitates the exchange of newly isolated strains of influenza virus for study purposes.

During the period covered by this report, July 1, 1953, to June 30, 1954, the incidence of influenza in the United States was the lowest in 4 years. It was characterized by the absence of outbreaks caused by influenza A virus although infections with influenza B and influenza C were recorded.

The failure to identify epidemic influenza A occurred in spite of extended epidemiological and laboratory studies by the military services and the Public Health Service, and in spite of close surveillance by State health departments and the Epidemic Intelligence Service of the Communicable Disease Center, Public Health Service. During almost every month of the winter season, Army area laboratories reported a few instances of a significant increase in titer of serum antibodies against influenza A in the hemagglutination inhibition tests. However, no report of the isolation of influenza A virus in the United States was received at the WHO Influenza Information Center.

Influenza B was diagnosed serologically in a number of high school students in Santa Clara County, Calif., who had respiratory illnesses in the middle and latter part of January. In February, March, and April, localized outbreaks of influenza B were identified in other parts of California. In late March and early April, a minor outbreak of influenza B occurred at a naval installation in Illinois. Strains of virus were recovered which appeared to differ from the Lee strain. Influenza B was also serologically confirmed in localized areas of Minnesota during March and April.

Influenza C virus was recovered first in December 1953 at a naval installation in Illinois, and then sporadically during the remainder of the winter. It was also isolated from 4 members of 1 family and from 2 other individuals in Norfolk, who had a respiratory illness in April.

The mortality experience during the winter season gave no evidence of any increase as a result of influenza, as, according to the National Office of Vital Statistics, is usually the case when an epidemic is prevalent.

In other parts of the Western Hemisphere, influenza A was identified in 2 small outbreaks in Puerto Rico in March, and 2 isolated strains were found to be similar but not identical to A/FW/1/50 and A/FLW/1/52.

In South Africa, during late May and June 1954, there was a sharp outbreak of influenza. Recovered strains examined at the World Health Influenza Center in London proved to be influenza A similar to the Liverpool strain A/England/1/51. In Australia, influenza A was also prevalent during the same period.

Dr. Davis is executive secretary of the Influenza Information Center, WHO Influenza Study Program in the United States, National Institutes of Health, Public Health Service. He is also chief of the Laboratory of Infectious Diseases, National Microbiological Institute of the Public Health Service. *In the December 1953 issue of Public Health Reports, p. 1141, Dr. Davis and Dr. C. C. Dauer discussed the occurrence of influenza for the period July 1, 1952, to June 30, 1953.*

PHR *Review*

The Chemical Control of Cancer

By JAMES F. HOLLAND, M.D.

SATISFACTORY THERAPY for most patients with cancer has not been achieved. The advances in surgery which permit more extensive operations and the increased control of tumors which can be exerted by the newer techniques and more powerful equipment of modern radiotherapy still fall desperately short of solving the problem. Most physicians are legitimately skeptical that further advances in these two disciplines can successfully cope with the challenge.

In 1953 approximately 224,000 people died from cancer in the United States (*1*). Of all patients with malignant disease, it is probable that only one-fourth to one-third are cured today. Full use of present knowledge and better methods for earlier diagnosis would surely save more lives. There remain, however, millions of persons who will die from cancer in the foreseeable future despite the most informed use of surgical or radiotherapeutic procedures, and regardless of the most meticulous attention to diagnostic techniques.

If an understanding of life is ever achieved in biochemical terms, it is a fair assumption that insight into the mechanisms of cancer will be realized pari passu. Despite the present lack of this understanding, two investigative approaches could be extended with reasonable hope of finding useful clinical applications.

The first approach, studies of carcinogenesis, may elucidate avoidable environmental or endogenous factors which, though now unknown, may be responsible for many cancer deaths. Recognition and avoidance of certain carcinogenic materials in the environment in the past have diminished their hazard. The observations of Pott in 1775 on carcinoma of scrotal skin in chimney sweeps (*2*) antedated by decades the appreciation of potential carcinogenicity associated with beta-naphthylamine and benzidine (bladder), ultraviolet radiation (skin), X-irradiation (skin, marrow, bone), and arsenic (skin), to name but a few well-established examples. Many other substances have been suspected of significant roles in human carcinogenesis: cigarette smoking (lung), urban soots (lung), chromate (lung), asbestos (lung), and smegma (penis and cervix) (*3–6*).

The positive identification of carcinogens is difficult. This difficulty may better be appreciated if it is recalled that the identity of the cancerous process in all its different types and loci is far from certain; there may be as many endogenous carcinogens as there are cancers, and perhaps multiple conditions must be satisfied for malignant growth to occur (*7, 8*). Despite the enormity of the task, the possibility is real that etiological and pathogenic factors can be identified and can then be avoided or counteracted. Research in carcinogenesis is deserving of the most intensive studies.

Chemotherapy of cancer is the second ap-

Dr. Holland, previously with the National Cancer Institute, Public Health Service, is now associate chief of medicine at Roswell Park Memorial Institute, Buffalo, N. Y.

proach which has the potentiality of effecting a major decrease in cancer mortality. This potentiality has not been realized in man; indeed, no compound in use or under study at present offers significant promise of producing cure of human cancer. That there are systemic agents at all which alter the course of some malignant diseases is a signal achievement worthy of full exploitation. Several drugs in current use offer worthwhile benefit to cancerous patients. Close study of these agents may promote synthesis of drugs possessing cancerocidal rather than cancerostatic action, or discovery of compounds better able to provide remissions, if not cures.

Certain characteristics of the several cancer chemotherapeutic drugs permit their classification in different ways. Perhaps the broadest of these classifications describes the mechanism of action as interpreted clinically. Essentially these drugs may be segregated into (*a*) those agents which chiefly effect the host's response to, or toleration of, malignant tissue, with a variable degree of effect on the cancer cells, and (*b*) those agents which exert toxic action directly on cancer tissues, with a variable degree of toxicity in normal host cells.

The antineoplastic effect of the drugs to be discussed, although not cell-specific, is not diffuse nor wholly nonspecific. To a great extent the effect is limited to a certain disease or group of diseases. Without major exception, those malignant growths which currently can be favorably modified by drugs arise from hematopoietic tissues, lymphoid and reticular tissues, and from some of those organs whose functional status is influenced by endocrine control. For the vast majority of individuals with metastatic carcinomas, there is no drug of proven value. Many reasons might be advanced for the failure of response of carcinomatous cells. Surely there are chemical differences between carcinomatous and lymphomatous cells. These may involve such factors as the relative degree of variance from normal cells, the rate of growth, and the ability to tolerate or adapt to modified biochemical environment.

The drugs of clinical value with current applicability in cancer chemotherapy are: the nitrogen mustard compounds, mechlorethamine and triethylene melamine; the folic acid antagonists, a-methopterin and aminopterin; the purine analog, 6-mercaptopurine; the hormones, cortisone and testosterone; and the estrogenic substance stilbestrol. Note will be made of adrenalectomy and hypophysectomy and of some chemical agents of limited clinical importance: urethane, myleran, and the ethylene phosphoramides.

Nitrogen Mustards

Mechlorethamine (HN2) has usually been called nitrogen mustard, the generic name for the entire group of compounds, since its initial use in clinical medicine in 1942 (*9*). It is a highly active compound which forms stable linkages with many constituents of essential biochemical reactions, according to the general schema in figure 1.

Reactions occur with amino groups, carboxyl groups, sulfhydryl radicals, proteins, certain vitamins, purine and pyrimidine compounds, nucleic acids and with many other molecules of biological importance (*10*). The rate of chemical reaction with these compounds is extraordinarily rapid, and within several minutes the drug is fixed to tissue constituents. Most of the effects of such chemical alterations, however, are not manifest biologically until many hours or days later.

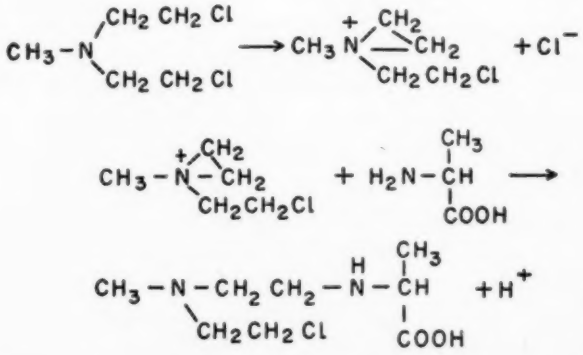
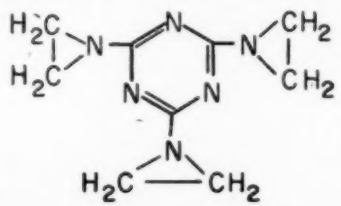


Figure 1. The interaction of mechlorethamine with the amino acid, alanine.

Triethylene melamine (TEM) possesses three ethylenimine groups and participates in reactions similar to those of mechlorethamine. There is no essential difference in their mechanisms of action, nor in their spectrum of anti-

tumor effects. Both nitrogen mustard compounds demonstrate their greatest usefulness in the lymphomas, and each should be employed as a complement to radiotherapy. They do not supplant localized irradiation in the treatment of localized disease. When a lymphoma becomes "active" simultaneously in multiple sites, however, its control by radiotherapy is difficult or impossible. The delivery of sufficient radiation to several involved areas in an attempt to control tumor growth may induce profound marrow suppression or death.

The efficacy of HN2 and TEM is qualitatively the same in Hodgkin's disease and the lymphosarcomas. In the latter, the effects are usually the most striking in giant follicular lymphosarcoma, to a lesser extent in lymphocytic lymphosarcoma, and least in reticulum cell lymphosarcoma. In the course of Hodgkin's disease, fever, pruritis, exacerbations involving multiple node areas, and other indications of generalized disease are common. The administration of mechlorethamine or triethylene melamine is frequently propitious under such circumstances. Decrease or disappearance of tumor masses, beginning even within 24 hours, abolition of fever, relief from itching, and other evidences of clinical remission may follow shortly upon the administration of a nitrogen mustard compound.



Triethylene melamine

The duration of such remission, if it occurs, is extremely variable; although in giant follicular lymphosarcoma remission of generalized disease may persist for months or years, the average duration in Hodgkin's disease and lymphocytic lymphosarcoma is measured in weeks. Radiotherapy may be used to great advantage to effect further regression in important local areas if the response to mechlorethamine or TEM has been suboptimal.

Another indication for mechlorethamine arises when space-occupying or invasive lymphomas have compressed to dangerous extent such organs as the trachea or the spinal cord. An initial vascular reaction with edema, frequently encountered after aggressive radiotherapy, is not seen with mechlorethamine. Intravenous administration of this compound may offer rapid effect in an emergency situation.

It has been stated that the nitrogen mustard compounds are effective in radioresistant lymphomas, that they preserve the sensitivity of a tumor to radiation, and that their use prolongs life in a way different from, and supplementary to, the benefit gained from radiotherapy. There would seem to be little substance to these claims. The apparent effect of nitrogen mustards in lymphomas not responding clinically to radiation is explained by the suppression of many areas of tumor activity simultaneously. In contrast, successive radiation treatments to local areas allow new or continuing tumor activity to flourish in untreated sites. When a tumor mass fails to regress locally under properly directed and adequate radiation therapy, no major regression is to be expected in that area after nitrogen mustard administration (*11*). It has been demonstrated that no difference in survival exists between a group of patients with Hodgkin's disease treated with radiotherapy alone and a group subjected alternately to courses of radiation and mechlorethamine treatment (*12*). The number of radiation treatment days per month in the mustard plus X-ray group was decreased, however, in contrast to radiation alone, thus affording easier clinical management of the patient.

In other diseases, nitrogen mustard compounds give measurable improvement, ranging from major regression of the neoplasm to symptomatic benefit. Because of the convenience of oral administration, TEM is profitably employed in mycosis fungoides, in chronic myelocytic leukemia, in chronic lymphocytic leukemia in small dosage, in metastatic cystadenocarcinoma of the ovary unsuited to other therapy, and in some cases of inoperable bronchogenic carcinoma (*13–15*). Recently, TEM has been found to produce far better results when used in conjunction with X-ray therapy, than X-ray alone in the treatment of retinoblastoma (*16*). There is no convincing evidence that the results of using the nitrogen mustards in sar-

coidosis and the nephrotic syndrome, or in other nonmalignant diseases, justify the procedure.

The toxicity of mechlorethamine is expressed almost immediately in nausea and vomiting, but this manifestation is satisfactorily controlled in most individuals with chlorpromazine. Triethylene melamine is a less serious offender in this respect. Lymphocytopenia followed by granulocytopenia, thrombocytopenia, and anemia is common to both HN2 and TEM administration. The occurrence of severe marrow depression is not infrequent in those patients with marrow replacement by tumor or with suppression of hematopoiesis from prior radiation or chemotherapy. If tumor invasion of the marrow is decreased following the nitrogen mustards, however, hematopoietic improvement may counterbalance the pancytopenia from the drug (*13*, *17*).

Mechlorethamine must be administered intravenously; this is conveniently performed by injecting the drug freshly dissolved in water or saline through the tubing of an infusion already running. Extravasation is highly irritating and venous thrombosis is not uncommon when HN2 is injected directly. The administration of 0.4 mg./kg. as a course of treatment is usually both safe and effective. This may conveniently be done by giving 0.2 mg./kg. on two successive evenings so that heavy nocturnal sedation may also be utilized to inhibit vomiting.

The parenteral administration of TEM would seem to command little advantage over HN2 (*13*). Its oral use, however, is worth while because hospitalizations solely for nitrogen mustard therapy can largely be avoided. When administered to a fasting patient, with 2 gm. of sodium bicarbonate to neutralize the gastric contents, formation of active ethylenimonium ion in acid medium is prevented, and reaction with compounds in the alimentary contents minimized. The use of 5 or 10 mg. of TEM initially, sometimes followed in 10 to 20 days with 5 and rarely 10 mg., has proved entirely satisfactory to achieve a "mustard effect" (*18*). The failure of repeated-dosing regimens (*13*, *19*) to produce early hematopoietic depression, despite the large total doses ingested, probably lies in acidic activation and reaction of the ethylenimonium ion of TEM and consequent failure of absorption of fully active drug. When administered with sufficient alkali, it is likely that such large total doses would prove disastrous.

Folic Acid Antagonists

The association of anemia in chicks with deficiency of dietary substances found in liver, spinach, and yeast was subsequently recognized to represent, in actuality, folic acid (pteroylglutamic acid) deficiency (*20–23*). Granulocytopenia in rats on purified diets was found to be correctible by administering folic acid (*24*). Acceleration of the acute leukemic process in children after administering derivatives of folic acid was described (*25*). The clinical trial of a compound chemically similar to folic acid, but antagonistic to it in a bacterial system dependent on folic acid for growth, was a normal sequence. The improvement in acute leukemia caused by the 4-amino substituted counterpart of folic acid, aminopterin, established the antineoplastic use of metabolic antagonists (*25*).

The 4-amino group is necessary for effective biochemical competition. A-methopterin (recently renamed methotrexate), the 4-amino-10-methyl-pteroylglutamic acid, has become the most widely used of the antagonists because of its clinical suitability. The folic acid antagonists affect many biochemical systems where transfer of single carbon units is involved. The syntheses of purines and nucleoproteins, the activities of several enzymes, the transformations of certain amino acids, and probably many other processes are diminished or interrupted (*26*).

In experimental systems involving mammalian tissues the inhibition exerted by a folic acid antagonist has been found to be irreversible by folic acid itself. Recent study has established, however, that folic acid exists in equilibrium with folinic acid in the body. This more active compound can successfully compete with aminopterin, and it has been suggested that the antagonist irreversibly prevents conversion of folic acid to folinic acid, whereas the antagonism to folinic acid is competitive and reversible (*27*). These relationships are shown in figure 2.

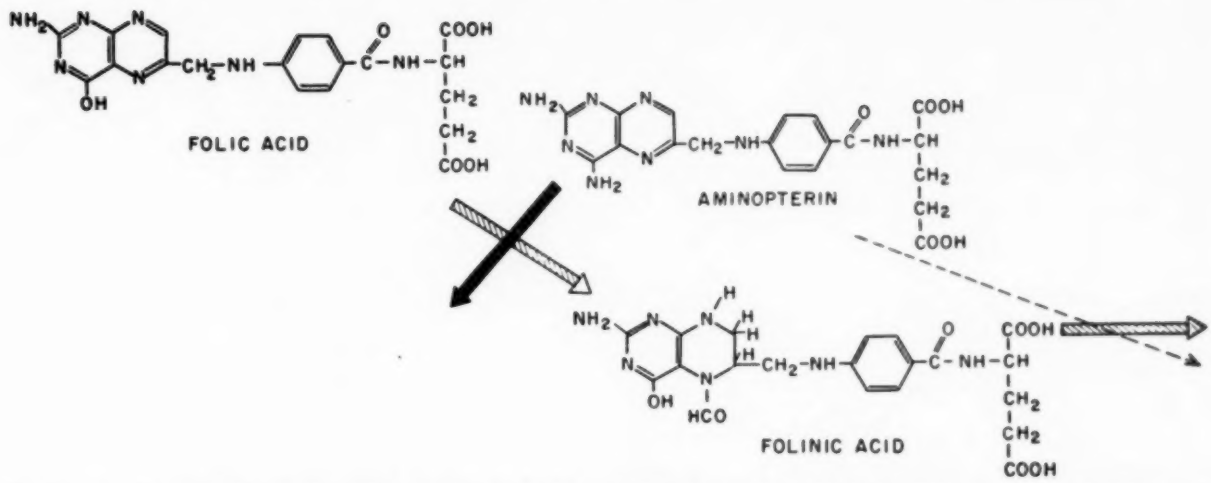


Figure 2. The relation of aminopterin to folic and folinic acids. The shaded arrows indicate normal metabolic pathways. The black arrow represents complete and irreversible antagonism. The interrupted arrow represents competitive antagonism.

In acute leukemia of childhood, the use of methotrexate may result in a temporary cessation of the clinical and morphologic characteristics of the disease. Within a period of 10 to 50 days, one may see disappearance of blast cells in the marrow and peripheral blood, regression of adenopathy and visceromegaly, reestablishment of erythropoiesis, normal leukocyte and platelet production, healing of bone lesions, and clinical well-being. Approximately one-third of those children treated will enjoy a complete or "hematologic" remission, and another one-fifth will sustain appreciable benefit despite the readily demonstrable presence of leukemic cells. The duration of improvement may continue for a few years in isolated instances, but in the average remission, benefit lasts about 10 weeks (*28*).

In the acute leukemias of adulthood, results comparable to those encountered in children are disappointingly rare. Although remissions do occur, only 13.5 percent of 163 adults selected from several reported series experienced any clinical benefit whatever (*28*).

Clinical and morphologic manifestations of acute leukemia reappear at some time during or after folic acid antagonist therapy. Although a second and even a third remission may sometimes be effected by reinstitution or increase of the drug, eventually the disease becomes refractory to folic acid antagonist therapy.

This refractoriness can be exemplified and interpreted by consideration of acute leukemia in rodents. The emergence of resistant strains of leukemic cells which can survive and multiply despite ordinarily suppressive levels of antagonist has been demonstrated (*29*). An understanding of the insensitivity of the cells to antagonists can probably be found in such factors as more efficient absorption and utilization of folic acid, failure of antagonist to gain access intracellularly, better detoxification of antagonist, or alteration of cellular metabolism so that different pathways of synthesis can be utilized when those dependent on folic acid or folinic acid are blocked (*30*). It is probable that eradication of billions of leukemic cells sensitive to an antagonist leaves a residue of preexistent mutant cells insensitive to the drug. When multiplication of these unopposed mutants produces a nearly pure strain of resistant cells, no response to the provoking antagonist can be anticipated. Such insensitivity to folic acid antagonists in leukemic cells is a heritable trait, and strains of transplantable rodent leukemia which have developed resistance are maintained in many laboratories. A similar explanation is probably applicable to human acute leukemia when refractoriness to a metabolic antagonist occurs.

The chronic leukemias are relatively resistant to the folic acid antagonists, and their use in these diseases finds little support in the clinical

literature. The temporary response of neuroblastomas in children to methotrexate administration occurs sufficiently often to make this a reasonable palliative effort. Sporadic and unimpressive response has been reported in a variety of other neoplastic diseases investigated, but in none of these are the results sufficiently encouraging to suggest clinical application.

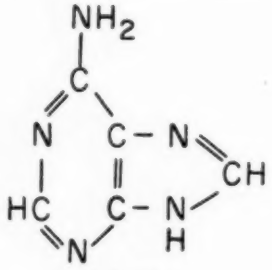
Toxicity is most apparent in those body tissues where rapid cellular proliferation is characteristic. Marrow depression with severe leukopenia, granulocytopenia, anemia, and thrombocytopenia may occur. The epithelium of the alimentary canal is highly susceptible. Anorexia, vomiting, diarrhea, and abdominal pain are often early indications of host toxicity. Ulceration of the oral mucosa, necrosis of interdental papillae and intestinal bleeding are more serious adverse effects. Skin eruptions and alopecia are occasionally seen.

The toxicity of aminopterin or methotrexate is counteracted to some extent by the use of folinic acid (citrovorum factor, Leucovorin). The biochemical competition exerted by folinic acid interrupts the metabolic blockade of the antagonist, and normal chemical pathways are presumably reestablished. A feeling of well-being replaces the malaise and apathy which accompany the toxic state. Remission of the signs of toxicity follows. There is no conclusive evidence that folinic acid per se modifies the acute leukemia (*31*).

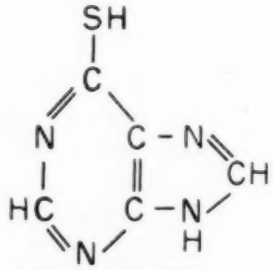
Methotrexate is administered in doses of 2.5 to 5.0 mg. daily, orally. Only rarely are larger daily doses worth while, and then the risk of fulminant toxicity is considerable. The minimum effective dose of folinic acid for relief of methotrexate toxicity is not firmly established. In the range from 10 to 30 mg. daily in divided intramuscular doses, satisfactory results have been observed (*31*).

Purine Analogs

The dominant position that nucleoproteins occupy in cellular metabolism and reproduction has prompted extensive studies of their biochemistry. Nucleic acid is the highly polymerized residue of nucleoprotein after protein has been removed. The constituent moieties of any particular nucleic acid are molecules of phosphoric acid, of a pentose sugar, ribose or desoxyribose, and of a few types of the heterocyclic compounds, pyrimidines and purines. Analogous compounds to the pyrimidine and purine bases have been synthesized (*32*, *33*) in search of metabolic antagonists which could modify the formation of nucleoproteins in cell reproduction and survival. Many antimetabolites active against micro-organisms, malarial parasites, and animal tissues have resulted from these systematic studies.



Adenine



6-Mercaptopurine

The activity of 6-mercaptopurine against certain transplantable animal tumors has been shown to be remarkably efficient (*34*, *35*). Its introduction into clinical medicine in April 1952 was rapidly followed by a definition of its scope of usefulness; to date it is the most practicable of the purine analogs for use in man.

The mechanism of action of 6-mercaptopurine is unknown. It has not yet been proved that 6-mercaptopurine is incorporated into nucleic acids, although much evidence suggests it. Further, if incorporated, it is not known exactly how this is detrimental to the cell. There are physiological compounds of importance other than nucleic acids which contain adenine, such as coenzymes, and it is possible that 6-mercaptopurine exerts antagonism to adenine in these compounds.

Clinically, 6-mercaptopurine demonstrates salutary effects in the acute leukemias and in chronic granulocytic leukemia (*36*). Approximately one-third of the children and a smaller proportion of adults with acute leukemia enjoy major reduction in acute leukemic pathology and symptoms when taking 6-mercaptopurine. A lag period of a few days to several weeks may precede response. When well established, a

remission may progress to disappearance of adenopathy, visceromegaly, and abnormal cells in marrow aspirates. The duration of remissions is usually measured only in weeks or months. Relapse occurs when blast suppression is ineffective. This is explained, as with the folic acid antagonists, by the resistance of the leukemic cells to the biochemical actions of 6-mercaptopurine. Similar resistance phenomena have been demonstrated and studied in murine leukemia (*37*).

In chronic granulocytic leukemia, satisfactory decrease in peripheral white count and visceromegaly can be achieved with 6-mercaptopurine. In the blastic crisis of the acute preterminal phase of chronic granulocytic leukemia, reports of temporary improvement from 6-mercaptopurine have been made. This stage of the disease has been singularly unresponsive to radiation or other chemical agents, and 6-mercaptopurine commands a unique advantage here. In generalized reticulum cell lymphosarcoma, 6-mercaptopurine has produced minor benefit. It holds no significant value for chronic lymphocytic leukemia, the other lymphomas, or in patients with metastatic carcinoma (*36*).

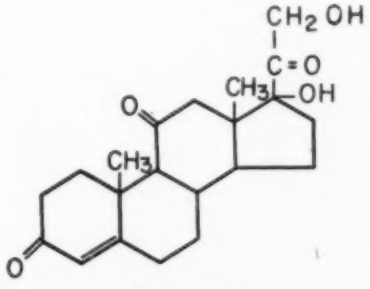
In both experimental and clinical leukemia it has been shown that the inhibitions effected by folic acid antagonists and purine analogs are not biochemically the same. Thus, resistance to an antifolic compound does not preclude sensitivity and response to an antipurine, and vice versa (*36, 37*). The sequential use of these compounds, therefore, offers the possibility of two remissions. There are theoretical advantages to the simultaneous use of both compounds from the start of treatment (*38*), and this area is being explored clinically (*39*).

The toxicity of 6-mercaptopurine is manifest by phenomena quite similar to those of the antifolic compounds. Substantial inhibition of hematopoiesis with resultant pancytopenia may lead to death. In some instances, leukopenia precedes thrombocytopenia and anemia sufficiently to afford warning of impending danger. Gastrointestinal dysfunction occurs less frequently than with methotrexate, but may be equally as severe. Oral ulceration ascribed to the drug has occasionally been seen in patients with acute leukemia. No satisfactory agent for the reversal of the toxicity of 6-mercaptopurine has been used in man. In rodents, several compounds which already contain adenine, such as adenylic acid and adenosine, or guanine, such as guanylic acid and guanosine, are effective in diminishing the effects of 6-mercaptopurine. The purine bases, adenine, guanine, and hypoxanthine, are inferior in allaying toxicity (*40*).

The dose of 6-mercatopurine ordinarily employed is 2.0 to 3.0 mg./kg. daily by mouth. More intensive dosage regimens are said to offer slightly more efficacy, but the toxicity encountered is increased. There is little support for intermittent dosage regimens. Once the drug has been instituted in acute leukemia, discontinuation, except for toxicity or refractoriness, is unnecessary. Sufficient time has not elapsed to judge the optimal methods for use of 6-mercaptopurine in chronic granulocytic leukemia except in its acute terminal phase where continuous administration is practiced.

The Adrenal Cortical Steroids

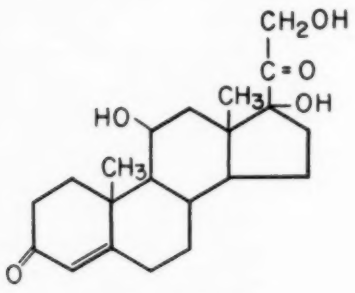
The adrenal cortical steroids, cortisone and hydrocortisone produce qualitatively indistinguishable responses and will not be treated separately. Corticotrophin elicits entirely similar phenomena by inducing endogenous corticosteroid production. Accordingly, cortisone will be used for the generic name.



Cortisone

The response to cortisone has been widely studied in patients with malignant disease. Some apparently specific responses occur in addition to a sense of physical well-being, polyphagia, and elation, which many patients may experience temporarily irrespective of the type of their neoplasm. The most satisfactory specific effect is seen in acute leukemia of child-

hood. With dramatic speed, regression of the signs of disease may occur when cortisone is administered. The swiftness, and to some extent the surety, make cortisone the agent of choice when beginning treatment of a critically ill acute leukemic patient. Cessation of hemorrhage, often before any change in platelet count, and return toward normal hematopoiesis may be evident within a few days. Complete regression of the disease state may follow.



Hydrocortisone

The mechanism of action is unknown. There is a specific effect on the leukemic cell over and beyond the systemic benefits, which is probably akin to the lymphocytolysis seen in normals. The remissions induced are shorter than those from a-methopterin or 6-mercaptopurine, averaging about 6 weeks. If relapse appears while taking adequate cortisone, increase in dosage is but a temporary expedient, and the disease rapidly becomes wholly uninfluenced by the drug. It is in this period of increasing dose and declining antineoplastic activity that the patient may be subjected to intense hyperadrenocorticism.

There is no interrelation of sensitivity or refractoriness to cortisone, 6-mercaptopurine, or a-methopterin. A particular child may enjoy hematologic remission from any, all, or none of these drugs (*36*). No criteria are yet available to predict susceptibility other than clinical trial; accordingly, consideration must be given to clinical management and the choice of antileukemic drug which is to be used first. When the severity of the patient's disease threatens imminent demise or catastrophe, cortisone is best employed, because of its rapidity of action and value in thrombocytopenic hemorrhage, in an attempt to assure survival for a trial of the other drugs. Of the antimetabolites, it would seem safer to begin with methotrexate because folinic acid has at least the potentiality of competing with methotrexate in the event serious drug toxicity occurs.

Uremia, attributable to uric acid crystallization within the kidney, has been described following the use of several different chemotherapeutic agents in instances where extremely rapid tumor destruction ensues. This is a rare complication of acute leukemia when a precipitous fall in leukocytes follows institution of therapy.

Cortisone administration produces considerably less objective evidence of improvement in acute leukemia of adults than of children. Its administration is often attended by some symptomatic benefit, however, which makes it worth while. The lymphocytic leukemias, in chronic or subacute phase, may respond favorably with decrease in leukemic cellular infiltrations and increase in normal marrow function. In a small proportion of patients with Hodgkin's disease or lymphosarcoma, objective diminution in tumor tissue can be demonstrated, and in a larger group, clinical improvement occurs without appreciable change in node masses (*41*, *42*).

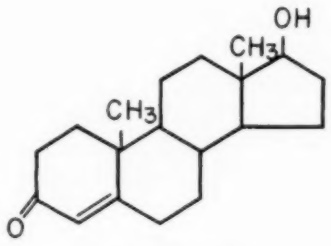
Cortisone often stops bleeding due to thrombocytopenia without increasing the platelet count or modifying the cause of disease in any other way. Decrease in hemolysis associated with splenomegaly in the lymphomas and leukemias may be detected during cortisone administration. Most of these effects are of short duration, but the important temporization afforded frequently allows return of marrow function before a myelotoxic insult is again sustained. Conversely, there is no apparent effect of cortisone on the pancytopenia caused by those drugs toxic to marrow function which are described in this review.

Recently, the use of large doses of cortisone (0.3 gm. daily) in treating metastatic carcinoma of the breast has been reported to produce objective evidence of regression in nearly half the patients (*43*, *44*). Favorable response, where observed, was unrelated to ovarian or adrenal function, since prior surgical removal of these glands did not influence the results. The longest objective remission from cortisone lasted 3 months; symptomatic improvement

also occurred briefly in another third of the patients. At lower doses of cortisone (0.1 gm. daily or less) or with moderate doses of corticotrophin, some subjective improvement, but no objective regression has been seen (*45*).

Testosterone

The sex steroid, testosterone, exhibits its only major application in neoplastic diseases as a treatment for patients with metastatic carcinoma of the breast. A feeling of well-being is experienced by nearly two-thirds of the patients, and oftentimes dramatic disappearance of bone pain allows ambulation in otherwise bedridden women.



Testosterone

Symptomatic benefits far outstrip the objective responses which can be detected by clinical criteria or even by metabolic balance studies. In only 11–19 percent does regression of osseous lesions take place. Effects on soft tissue metastases occur in about 20 percent of cases but are less dramatic clinically than the response of bone disease; pulmonary, cerebral, and hepatic spread are infrequently improved to a significant extent by the administration of androgens (*46*).

The action mechanism of androgenic substances in metastatic breast cancer is unknown. Since clinical improvement is often observed without delay in the continuing growth and spread of the tumor, it is assumed that most of the beneficial effects derive from influences on the host tissues and the host's response to the tumor rather than from effects on the cancer cells per se. The palliation which results from androgen administration is relatively short-lived. (*47*). In one study, of those patients who responded favorably to testosterone, 95 percent did so within 2 months. Reactivation of symptomatology occurred within 6 months in 58 percent and in less than a year in 95 percent (*48*).

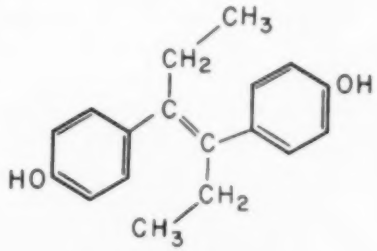
The most widely accepted dosage regimen for the administration of testosterone propionate is 0.1 gm. intramuscularly three times weekly. Larger doses of this compound have been found to offer little except an increased intensity of undesired effects (*46*). These phenomena include voice lowering, hirsutism, acne, edema, flushing, and increase of libido (*49*).

Methyltestosterone can accomplish virtually all the actions of testosterone propionate and is a useful oral therapy (*50*). Chemical hepatitis (*51*), which may occur from methyltestosterone treatment, is an uncommon toxicity that is not prohibitive. Stanolone, a new analog, offers no advantages over testosterone propionate (*52*).

In the presence of osteolytic lesions, any of the androgenic compounds can induce hypercalcemia, presumably through stimulation of the local demineralization process with production of a calcium load in excess of the renal capacity for excretion. Hypercalcemia may be manifested by anorexia, nausea, vomiting, constipation, oliguria, azotemia, apathy, coma, and death. The occurrence of hypercalcemia in approximately 10 percent of the patients treated with androgens must be anticipated (*53*, *54*). No thoroughly satisfactory treatment for hypercalcemia has been advanced (*55*).

Diethylstilbestrol

Diethylstilbestrol and the naturally occurring estrogenic compounds are used with good response in the majority of patients with carcinoma of the prostate, and in carcinoma of the breast of males and postmenopausal females.



Diethylstilbestrol

In males, stilbestrol administration is often a part and prolongation of "androgen control"

therapy which includes initial castration. In elderly females, it is said that estrogen administration changes the hormonal milieu to one alien to the cancer cells. Whether, indeed, stilbestrol has pharmacological antineoplastic actions which are independent of its estrogenic properties is not known. Regression of the primary tumor and soft tissue metastases as a result of stilbestrol therapy in carcinoma of the breast in females may be a dramatic event.

In one study, 90 percent of those patients who responded favorably did so within 2 months. The duration of response produced by estrogens was longer than that from testosterone; 30 percent of the patients were still in remission after 12 months, and 6 percent had not relapsed after 2 years (*48*). Degeneration of tumor cells and cicatrization of the tumor area, far in excess of similar phenomena in untreated cancers, has been demonstrated (*56*).

The association of significant benefit from estrogen administration and postmenopausal status of at least 5 years, without regard to chronologic age, is persuasive. Major tumor regression has been produced in 24 of 99 women 5 years or more postmenopausal, whereas, only 1 of 42 patients below these limits sustained similar regression. Eight of the 42 younger women suffered exacerbation of their cancer from estrogen (*48*). The use of estrogens in this latter group offers considerably less than androgen therapy. For the more advanced postmenopausal patients, however, stilbestrol is the most satisfactory and practicable drug (*46*).

The frequency of osseous metastases in older women is less than that in the physiologically younger age groups where testosterone is usually employed. In these more aged patients, however, equally good regressions of bone metastases are effected by stilbestrol. Nearly one-half of properly selected patients have regression in breast, skin, and lymph node spread, and one-third experience improvement in pulmonary lesions. Other visceral metastases are less responsive (*46*).

The medical management of prostatic cancer, by hormonal means, is more satisfactory than that for any other disseminated carcinoma. Stilbestrol in small doses is capable of prolonging life and palliating symptoms almost as effectively as castration. Extensive data indicate that a combination of castration and stilbestrol administration reduces mortality and morbidity for prostatic cancer more effectively than either method alone (*57*). Decrease in tumor activity evidenced by relief from pain, palpable diminution in, or disappearance of, tumor masses, reduction in, or cessation of, osteoplastic activity of metastases, and a fall in circulating acid phosphatase are among the benefits seen. Restitution to nearly normal health occurs while the tumor is regressive or static. A marked decrease in the extent and cellularity of malignant tissue is noted microscopically, and diagnostic characteristics of carcinoma may be nearly lacking.

The duration of such a remission in patients who have been castrated and given estrogen therapy is appreciable. Thirty-five percent of men with metastases, and 50 percent of those without metastases, at the time of institution of treatment, survive for 3 years (*65*). Eventually, refractoriness to therapy and exacerbation of the disease occur despite administration of estrogen. A possible explanation of this phenomenon could be the tumor's sensitivity to androgens produced by the adrenal cortex (*58*). Temporary benefit in a fraction of the men at this stage of the disease following bilateral adrenalectomy lends some credence to this hypothesis. The lack of objective response in the majority of patients (*59, 60*), however, suggests that adrenal androgenic stimulation is not the essential support for progressive growth. Rather, a state of relative tumor autonomy, without regard to hormonal support or suppression, seems to succeed the condition of the previously dependent cancer in most patients (*7*). Accordingly, adrenalectomy for prostatic cancer has largely been abandoned.

The response of metastatic carcinoma of the male breast to castration, with or without estrogen, is qualitatively similar to the response of prostatic cancer. The frequency, completeness, and duration of objective and subjective response in the few cases reported (*61, 62*) are better than the response of carcinoma of the female breast to oophorectomy or to hormonal therapy.

Many dosage regimens have been advocated for stilbestrol administration in cancer patients.

These vary in the main from 1 to 1,000 mg. daily. A considerable experience has been obtained in the lower dosage range from 1 to 15 mg. per day in divided doses orally. No convincing evidence exists that larger doses accomplish qualitatively or quantitatively different results. The more common undesired effects of stilbestrol are anorexia, nausea and vomiting, fluid retention, breast engorgment (gynecomastia in males), nipple and axillary pigmentation, frequency and incontinence, and interval and withdrawal uterine bleeding. Hypercalcemia while taking stilbestrol has been reported in women with osteolytic metastases from breast cancer (*46*, *49*).

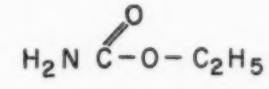
Endocrine Surgery

Many agents and procedures are currently under investigation to determine their place in the medical control of cancer. Of these, one must mention bilateral total adrenalectomy. In certain patients with carcinoma of the female breast, adrenalectomy has been shown to afford objective and subjective remission (*43*, *59*, *60*, *63*, *64*). Evidence has been presented that predictability of the response to operation may be possible. Differentiation of the tumor, in contrast to anaplasia, is reported to be associated with good clinical response (*63*). Others have been unable to confirm this (*43*, *60*). When sensitivity of the carcinoma to administered estrogens has been demonstrated, where such sensitivity or "dependency" is determined by an increase in negative calcium balance in patients with metastatic osteolytic lesions subjected to a challenge course of estrogens, oophorectomy and subsequent adrenalectomy have offered benefit, presumably by removal of estrogen-producing tissues (*43*). The position that adrenalectomy will have in the management of metastatic breast cancer is not yet defined. In the meantime, the extent of the procedure, with the hospital and economic burden entailed, properly limits its indiscriminate empiric use.

Hypophysectomy has been performed by one group on nine patients with carcinoma of the breast. In only a single patient is sufficient data available to assess the response, and she enjoyed moderate benefit (*65*). More recently, objective diminution in osteolysis during the course of metastatic breast cancer has been reported following hypophysectomy in two patients who previously had had oophorectomy and adrenalectomy (*66*). The subsequent administration of somatotropin was associated with metabolic evidence of progression of the disease, reflecting a direct effect of somatotropin on human breast cancer. Other reports of failure to improve patients with malignant melanoma (*67*) and adrenal cortical carcinoma (*68*), together with the magnitude of the procedure (*65*), suggest a reserved and critical evaluation of this operation before it is enthusiastically accepted into surgical endocrine therapy.

Urethane

Urethane is a simple chemical compound first reported in 1946 to be of use in treating the chronic leukemias (*69*). A considerable experience in these diseases has established a place for urethane as a satisfactory alternative to radiotherapy. Continuous administration at levels of 1 to 5 gm. daily may achieve satisfactory response although there is rather wide variation in the dose capable of initiating remission. In 13 patients with chronic myelocytic leukemia, 19 to 134 gm. were required in 11 to 36 days to effect a drop in leukocyte counts to levels approximating 20,000. In chronic lymphocytic leukemia, where response was less regular, even more discrepant results were encountered (*69*). The compound demonstrates no clinical usefulness in the acute leukemias. Anorexia, nausea, and vomiting are prominent side effects, but they may be averted by rectal administration (*65*, *66*). Pancytopenia may result from excessive dosage.



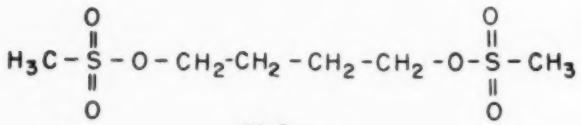
Urethane

The effects of urethane in multiple myeloma are variable. Diminution in plasma cells and myeloma cells in the marrow, decrease in Bence-Jones proteinuria and hyperglobulinemia, relief from bone pain with occasional recalcification, and striking clinical improvement have been de-

scribed (*71–73*). Such amelioration is inconstant, however, occurring in about one-third of the patients with myeloma, and usually persisting for only weeks to months. Radiotherapy directed to painful osseous lesions frequently affords palliation and is a helpful adjunct. The rarity of objective remission from 6-mercaptopurine (*74*) does not support the routine use of this compound in patients with myeloma. Substantial improvement does occur in a fraction of patients treated with ACTH or cortisone (*75*), and these drugs, because of their relative freedom from serious toxicity, seem worthy of trial in a given patient.

Myleran

Myleran is the most active member of a series of aliphatic disulfonic acid esters. This series, because of its chemical resemblance to the nitrogen mustards, was purposefully synthesized in search of compounds with similar biological properties (*76*).



Myleran

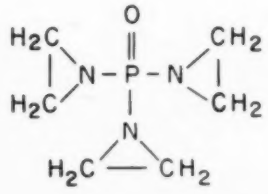
Clinically, myleran has found satisfactory application in chronic myelocytic leukemia (*77, 78*) where fall in leukocyte counts, particularly of immature granulocytes, decrease in splenic size, and rise in hemoglobin follow administration. Lymphocytes are relatively resistant to the action of the drug, but decrease in platelets occurs in virtually all patients and the decrease may continue for many weeks after initiation of treatment. Bleeding may supervene when thrombocytopenia is sufficiently marked.

Wide variation in dosage regimens has been studied. The most satisfactory would appear to be maintenance therapy at about 4 mg. daily, with or without an initial loading dose, in patients checked frequently with blood counts. Under such a treatment regimen, approximately half of the patients with chronic myelocytic leukemia whose treatment has been reported have enjoyed clinical remission and hematological control for 6 months or longer.

Resistance to therapy has been encountered in some patients after initial response. Although patients believed to be refractory to further radiotherapy have responded, in certain instances dramatically, remissions have been rather unsatisfactory and brief when the cell type has been characterized by a higher proportion of myeloblasts, as is frequently the case in the preterminal radioresistant stages of the disease. Acute leukemia has not been benefited (*77, 78*). Although myleran is effective in suppressing many rodent neoplasms, it has been found ineffective in a variety of metastatic human carcinomas (*79*).

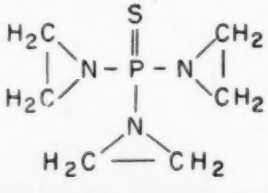
Ethylene Phosphoramides

The actions of mechlorethamine and triethylene melamine in experimental and clinical cancer have stimulated the synthesis and investigation of other compounds which carry ethylenimine groups. Two of the ethylene phosphoramides, triethylenephosphoramide (TEPA) and triethylenethiophosphoramide (thioTEPA) have been subjected to clinical trial.



Triethylenephosphoramide

In rats, TEPA and thioTEPA have a spectrum of anticancer effects similar to one another and to TEM (*80*). In patients with a variety of malignant neoplasms, the results following TEPA administration have approximated those with TEM (*81, 83*). It has not achieved wide clinical application.



Triethylenethiophosphoramide

ThioTEPA has produced satisfactory initial responses in patients with chronic myelocytic leukemia (*84*). Regressions of metastatic carcinomas of the breast and ovary, and of other miscellaneous sites have been reported to occur with considerable regularity following its use by parenteral injection (*84, 85*). Particularly satisfactory remissions have been described after injection directly into a tumor mass.

Inadequate time has elapsed for critical appraisal of this compound by other investigators; the passage of time will also permit evaluation of the duration and clinical value of the response elicited so far. It seems doubtful that intratumor injections should be required if the drug has striking anticancer effects.

Conclusion

The chemical control of cancer has not yet been realized. Within the past 15 years a more profound understanding of cancer has been achieved, and several approaches to its treatment with drugs have been reviewed in this paper. To an appreciable extent, the advances which have been made stem from knowledge and intent rather than from happenstance.

Cancer cells are different from their normal counterparts when viewed under a microscope. Although it is possible that this difference is purely one of rearrangement of the same chemical components within the cell, a vast amount of evidence defines at least quantitative alterations in composition. Functional capacities of malignant and normal cells of homologous tissues may be greatly different. Therapeutic agents which depend on these quantitative differences in the metabolism of cellular constituents afford promise for future progress. A constant search for qualitative differences between neoplastic and normal cells may elucidate obvious pathogenic or perpetuating mechanisms which can be interrupted. Further, it seems within the realm of possibility that pharmacological agents will be found that can effectively counteract the etiological factors which lead to cancer—be they viral, chemical, or physical exposure; idiopathic mutation; or a still unrecognized multitude of cellular insults.

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Joseph Goldberger Award Presented

Dr. Russell M. Wilder, director of the National Institute of Arthritis and Metabolic Diseases, Public Health Service, from 1951 to 1953, recently received the American Medical Association's Joseph Goldberger Award for clinical nutrition. He was cited for his studies of diabetes mellitus and carbohydrate metabolism and for his program for nutrient-fortified foods.

The Joseph Goldberger Award, which consists of a medal and $1,000, is named for the famous National Institute of Health scientist, who was the first to demonstrate that pellagra is a dietary deficiency disease. Dr. Wilder was formerly chief of the department of medicine at the Mayo Foundation. He was a member of the *Public Health Reports* Board of Editors for 1952–53.

Nonmedical Administrators For District Health Units In New York State

By Robert M. Samet

THE SHORTAGE of public health physicians and the resulting problem of maintaining and improving local public health services has resulted in a growing interest in recent years in the possibility of delegating to trained nonmedical administrators certain activities and responsibilities which do not require specialized professional and technical skills. In May 1951, a report (*1*) of the Committee on Professional Education, American Public Health Association, stated that the "need for nonmedical administrative personnel is large and presumably will be an increasing one for some time to come." This report described a broad range of activities in which nonmedical administrative personnel are engaged and outlined desirable training, experience, and qualifications of nonmedical administrators.

Stimulated by this report, the New York State Department of Health conducted a study during 1953 to determine whether the services of nonmedical administrators might profitably be included in the existing organization of the district health offices in the State.

District State health offices in New York State are field units of the State department of health. These units and their staff serve the counties and municipalities of the State which do not have full-time city or county health departments. At the present, 16 counties in the State have full-time health departments and receive financial aid from the State, and there are 15 district State health offices.

All cities of over 50,000 population in the State are required to have a full-time health officer. In the district health offices, such staff functions as planning, budgeting, personnel, health education, and statistical services are performed by the central office of the State Department of Health at Albany. However, the district State health officer and his staff assist localities in performing these functions for counties which do not have county health departments but which employ field professional staff such as public health nurses, dental hygienists, clinicians, and sanitary inspectors.

In New York State, it must be noted, the State department of health and local official public health agencies do not have legal responsibility for mental health, industrial health, or school health except in the cities of Buffalo, New York, and Rochester. The district State health officer, however, works in conjunction with the representatives of the responsible agencies.

Method of Study

During September and October 1952, I visited 2 district State health offices for a total of 5 weeks. These included a small rural district, 94,606 population, and a large urban district, 288,025 population. The major portion of the time was spent with the district State health officers since they perform the majority of administrative functions.

A time study record was maintained for vari-

Mr. Samet, a training technician in the office of personnel administration, New York State Health Department, conducted this study during an assignment as a public administration intern in the department's division of local health services. Before undertaking this study, Mr. Samet was given a comprehensive orientation in the organization, operating policies, and procedures of the New York State Department of Health; this included a brief period in a district health office in New York State.

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ous activities—dictation, program planning, conferences, and so forth—and the various health programs such as medical rehabilitation, cancer control, communicable disease control. This time schedule was designed to reveal three types of information: (*a*) the amount of time devoted to work of a technical or medical nature; (*b*) the portion of the working time not requiring technical or medical skills; and (*c*) the portion of time devoted to activities requiring professional prestige, lacking which it might be difficult for the specific task involved to be performed.

In addition, discussions in the 2 offices with the 8 persons interviewed and the 2 persons observed revealed their views regarding the usefulness and possible functions of nonmedical administrators if such positions were introduced into the district health office organization in the State.

Summary of Observations

Neither the number of districts surveyed nor the 5 weeks allotted to the study was sufficient to permit the formulation of definite conclusions. Furthermore, the workload and activities in the district health offices vary according to the time of the year so that the limited period of the study may not have been fully representative of the expenditure of time by the district office staff. Nevertheless, a number of observations could be made from the data collected. Four of these are given below.

1. Approximately one-half of all the activities of district State health officers are concerned with the performance of administrative (nontechnical) functions which do not require medical public health knowledge or skills. These activities consume about one-half of the officer's working time.

2. Of the district State health officer's total activities, approximately 25 percent include a factor of professional prestige, the lack of which might impede the performance of such activities by a person without a medical degree. However, only 12 percent of the total nonmedical activities performed included the professional prestige factor.

The factor of professional prestige was judged on the assumption of a nonmedical administrator's having little or no prestige initially. It is quite possible that a capable nonmedical administrator could, in time, develop personal prestige so that he would be able to deal with the many situations which, at the time of the study, demanded the professional stature of a physician. This belief is influenced somewhat by the known performance or history of the many hospital administrators who do not possess medical degrees, but who through the years have gained stature in a professional environment similar to that in which a nonmedical administrator would work.

3. Discussions with the professional personnel revealed that those interviewed look favorably upon the concept of a nonmedical administrative position in the district State health offices.

4. Medical health officers freed from performing those activities not requiring special medical training would have almost 50 percent more time to devote to duties which require medical and public health knowledge and judgment.

This conclusion is based on the premise that nonmedical administrators will in time develop sufficient personal prestige to relieve the district State health officer of a large portion of the administrative functions requiring the stature of a physician. If this premise is not granted, the district State health officer could still be relieved of 44 percent of his functions which would enable him to become more active in the newer fields of public health.

Although this study does not attempt to reach any final conclusions concerning the usefulness of nonmedical administrators in district health offices in New York State, it would appear from the observations that by proper use of trained nonmedical administrators in district offices, the professional medical, nursing, and engineering staff would have more time available for the performance of duties for which they are specifically trained and equipped.

These observations suggest the desirability of further studies of this nature. A similar study is now being planned to determine whether nonmedical administrators might profitably be used in the full-time county and city health departments of the State. Consideration must be given also to the need for inservice training of

the professional staff in order to make the best use of nonmedical administrators.

A Job Description

The following is a listing of suggested or possible functions of a nonmedical administrator in a district health office in New York State.

Administrative functions

Assisting in analyzing and appraising district State health office programs in accordance with standards established by the program director.

Assisting in the administrative phases of planning district State health office programs in accordance with standards established by the program director.

Resolving internal administrative conflicts and difficulties; that is, organizational relationships, internal controls, work simplification.

Arranging for clinics, conferences, and meetings; that is, location, space, scheduling, clearance, and publicity.

Advising and providing consultation on program coordination and planning.

Preparing for the signature of the district State health officer correspondence for which no medical training is required; that is, with children's courts and other agencies, staff offices of the State health department, or on the subject of postgraduate training, and so forth.

Authorizing and being responsible for the routine processing of medical rehabilitation and maternal and child health clinic report forms.

Surveys and special studies

Analyzing information regarding the need for clinics insofar as geographic location and frequency of clinic sessions are concerned; preparing conclusions and recommendations of such analyses for the use of the district State health officer.

Conducting surveys and special studies to assess the needs of community health services; in collaboration with the professional staff, translating the results in terms of program needs.

Performing research for the purpose of appraising and preparing recommendations or reports on existing or proposed programs within the district.

Tabulating and making graphic presentations of statistical data.

Assembling material for executive action by the district State health officer or the local health department.

Education opportunities

Assembling appropriate materials for the use of members of the district staff in preparing talks, articles, and so forth, and for general information.

In liaison with official and nonofficial agencies, assisting community groups and so forth.

Upon invitation, assisting voluntary groups in activities pertaining to public health demonstration projects.

Obtaining material for the preparation of press releases by the district State health officer, district supervising nurse, and other district office staff members.

Establishing a clearinghouse for written educational material, routing such material to proper staff members as well as to professional and other groups and individuals in the district.

Reviewing State programs and standards with local health personnel and guiding them when necessary.

Budgetary assistance

Assisting in the preparation of budget proposals and justification for State aid application by county public health committees and boards of managers of county and city laboratories.

Reviewing public health budgets for conformity to the standards and limitations established by the State commissioner of health.

Assisting in the adjustment of claims by the counties for State aid reimbursement.

Investigation and inspection

Participating in epidemiological investigations, case-finding programs, and activities relating to the control of communicable diseases and other diseases.

Inspecting laboratories using live animals for conformance to requirements for the use of live animals.

Performing general supervision of local vital statistics registrars within the district.

Personnel responsibilities

Recruiting and inducting clerical employees.

Orientating all new employees.

Scheduling vacations, and leaves of absence, and reviewing and approving time records, accident reports, expense vouchers, and all other personnel or fiscal transactions.

Conducting inservice training programs and making provisions for extension courses.

REFERENCE

(*1*) Professional education. Report of the chairman of the Committee [on Professional Education] to the Governing Council [of the American Public Health Association], October 1950. Am. J. Pub. Health 41: 57, May 1951, part 2.

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Authorized absenteeism from school for necessary health services is a problem school authorities frequently encounter. From data collected in a national survey, the author reports the decisions that some cities have made regarding this question.

Authorized Absenteeism From School For Routine Private Dental Care

By LEONARD F. MENCZER, D.D.S., M.P.H.

RELEASING school children during school hours for other than strictly educational purposes or other than school events is a subject of frequent discussion among educators and special interest groups.

To many educators, these excusals are a source of annoyance because they cause classroom interruptions, loss of school time, and administrative problems. The frequency of requests for excusals is better understood when one is cognizant of the large variety of special interests (health, welfare, religious, music, dancing, and so forth) seeking the school time of the young students. Usually, these interests feel that their endeavors are as important to the child as is his formal education, and each demands that school time be sacrificed in order to meet its particular needs.

Toward a better understanding of the many problems associated with children's dentistry, the following significant points may be alluded to in reply to the question why children should be released during school hours in order to receive private, routine dental care.

For many years, the dental profession has been confronted with the problem of meeting the dental needs of school-age children. Recent studies (*1, 2*) have demonstrated that the majority of school-age children do not receive adequate dental care. There is no question that these needs reach enormous proportions. As the age of the child increases, there is an increase not only in the percentage of children having dental defects but in the number of cavities per child (*3–5*). In fact, dental diseases are spoken of as the most prevalent diseases in man.

Many dental authorities have stated that if the entire dental manpower of the United States were devoted exclusively to the dental needs of school-age children, there would still be insufficient personnel to meet those needs.

Dr. Menczer, the public health dentist for the Hartford (Conn.) Health Department, was in charge of the Public Health Service Topical Fluoride Demonstration Program in Connecticut from October 1948 to September 1950. In 1947 and 1948, he directed the mobile dental unit for the Connecticut State Department of Health.

What the Dentists Believe

The dentist is cognizant of the fact that by the time a child enters school his first permanent molars, usually referred to as his 6-year

molars, appear, and almost all the permanent teeth are present in the mouth by the time he is graduated from high school. The dentist feels that during this period of school life the importance of dental preventive and control measures may be most effectively impressed upon the pupil and that the teaching of preventive dental measures alone is not sufficient. The inclusion of such phases of dental health as the care of teeth and the correction of dental defects should also be stressed. Using school time for this type of educational health experience and developing positive attitudes toward dental care contribute to both the "knowing" and "doing" phases of health instruction (*6*, *7*).

The dentist believes that it is contradictory for a school system to accept and discharge the responsibilities of conducting an education program to stress dental health and the results of its neglect without making some provisions for enabling the "effective demand" (defined as the desire for dental service and the ability to pay for it) group to receive the necessary dental care during school hours. In this connection, and not to be overlooked, is the fact that a school education program directed toward dental hygiene fosters the growth of a second group, the "potential demand" group, that also desires dental services but cannot afford to pay for it. For this latter group, the establishment of school dental clinics is desirable.

There are other factors to be considered in releasing school children for private dental care.

Dentistry for children, unfortunately, is not practiced by every member of the profession, even though it has often been spoken of in such glowing terms as "socially advantageous," "economically logical," "professionally intelligent." Until recently, these phrases have failed to attract even the number of dentists needed to meet the requirements for effective demand dentistry, much less the total needs of this age group. The burden of meeting the dental needs of that effective demand group, therefore, is thrown upon a disproportionately few dentists in any given community. In addition, the two specialties in the profession of dentistry that are devoted exclusively to the treatment of children, pedodontia, which deals with the care of children's teeth, and orthodontia, which deals with the correction of dental irregularities, can never hope to meet the needs of school-age children by limiting treatment time to after-school hours, Saturdays, and vacation periods because of the limited number of practitioners. As a group, these two specialties suffer most from existing policies whereby a child may not be excused during school hours to receive dental care.

Good dentistry can be practiced only in the setting of a good patient and a good dentist. What keeps a child from being a good dental patient? A day at school may be fatiguing for a young child. A dental appointment after a long, and perhaps difficult, day at school may be more than some children can bear emotionally. Many children (parents too) resent using play time and holidays for dental appointments. This may create a management problem and at the same time constitute a total loss as an educational experience.

There are times when the dentist does not do his most effective work on children. He practices dentistry for children best during the early morning and early afternoon when both he and the child are freshest. Because his workload increases as the day progresses and because of the onset of fatigue in the late morning and late afternoon, his threshold of irritability is lowered. To suggest that he devote after-school hours to children's dentistry seems somewhat unreasonable. In addition, since the dentist is least busy in the early morning and early afternoon, he can best apply, during those periods of the day, the time and patience, as well as the skill, required in training a child to be a good dental patient.

The suggestion is often made that after-school hours, Saturdays, and vacation time be devoted to dental care for school-age children. All of this time, of course, should be utilized to a maximum. The dentist realizes that repeated appointments during school hours not only disrupt the entire class but may seriously handicap a child's formal education. For that reason, he wants to keep the number of such appointments low. However, there are not enough Saturdays to meet the demand for children's dentistry. Also, such a program would interfere with time set aside for adult patients who cannot make a dental appointment during the workaday week.

Vacation time, of course, is ideal for meeting and completing the dental needs of school-age children. Unfortunately, the completion of dental needs at any one time is only temporary, because of the rapidity of tooth decay in primary teeth as well as the need for frequent attention during that period when the mixed dentition exists, the baby teeth being replaced by the permanent ones. Of necessity, therefore, completion of dental needs during the summer vacation period by no means precludes the child's having need for further care during the following fall or winter.

If every attempt is to be made to preserve the oral health of our younger citizens, there is much yet to be accomplished from within the dental profession; but, a great deal of assistance and cooperation is necessary outside the profession, specifically, the cooperation of the community in general and the educator in particular in recognizing the urgent need for good oral hygiene and in taking positive steps to achieve that goal. Since good dental health contributes significantly to a child's well-being, and since this contribution makes a child more physically capable of absorbing his school experiences, every effort should be made by both the dentist and the educator to aid the child so that he may grow in health. The educator, then, in making his decision concerning the problem of releasing school children for dental health purposes has these many factors to consider.

The National Survey

A national survey was undertaken in late 1953 to determine the actions and attitudes of educators to the question of excusing children during school hours in order to receive private, routine medical and dental care. Specifically, information was sought through the questionnaire method as to what the majority of school systems are presently doing and what trends, if any, exist concerning the policy of releasing time from education for specific health care. Although the questionnaire itself made reference to both medical and dental excusal policies, this report is devoted only to the dental aspects of the problem for the reason that requests for medical excusals are rather infrequent and create no problem. Where reference has been made to medical excusals by the respondents to the questionnaire, such replies have been incorporated in the discussion of the individual questions below.

One hundred and twenty-five questionnaires were mailed to the superintendents of schools in all cities of the United States with a population of more than 90,000 according to the 1950 census. Cities of that size were chosen in order to determine the actions of large communities concerning the problem of excusals. Although the findings reported here are not representative of all school systems and are not intended to be such, they do indicate a trend in major cities. Ninety-four replies were received to the 125 questionnaries mailed. These replies have been grouped by population of the city queried as shown in the accompanying tabulation.

Number and percentage of cities replying to questionnaire, by population

Population	Number of cities receiving questionnaire	Number of replies	Percentage of replies
90,000 to 100,000	19	14	74
100,000 to 250,000	66	46	70
250,000 to 500,000	22	18	82
More than 500,000	18	16	90
Total	125	94	75

It is evident that the questionnaire was given considerable thought by the school administrators to whom it was mailed since 75 percent of the questionnaires were completed and returned; many were accompanied with a letter offering additional information. Sixty-seven percent of the school systems replying endorse the practice of releasing children for health purposes, both dental and medical.

The results of the survey demonstrate that in more recent years educators are recognizing the importance of dental health in general health. With each passing year, too, it was found, additional school systems are permitting children to receive routine dental care during school hours. This is demonstrated by the fact

that of the 23 boards of education having formal, written policy for excusing children, with two exceptions, all policies have been adopted since 1949.

For convenience and clarity, the questions in the questionnaire are listed below with some of the typical replies.

Question No. 1

Are students in your school system excused for routine visits to a private physician or dentist?

The 94 replies received have been grouped in three categories:

Yes—63.
In effect, "sometimes"—15.
No—16.

Some remarks under the "yes" replies were to the effect that students may be excused during the school day to visit a private physician, dentist, or optometrist, or, upon written notice from the parent or guardian of the child to the school authority, or, only for such time as needed for treatment.

Some additional remarks made to the "sometimes" replies were:

"Occasionally, upon the request of the parent. We encourage appointments to be made out of school hours but at the same time try to be reasonable in terms of the best health of the pupil. For example, a child having considerable dental work to be done may be required to go occasionally during school hours."

"When visits outside school hours are impossible."

"Problems of this nature are dealt with on an individual basis in the different schools as the situation arises. We encourage that dental appointments and appointments with other doctors be made after school hours, but if an emergency arises and such arrangement is not possible, and if the parent presents a written request for a child to leave school to visit either a physician or a dentist, these requests are usually granted."

Additional remarks to the "no" replies were to the effect that very infrequently were dental or medical excusals permitted, usually in emergency cases only, or, only to visit public clinics or private physicians and dentists who charge clinic rates for children.

Question No. 1a

Does any legislation, State or local, or school policy exist specifically authorizing the absence of children from school for this purpose?

Question No. 1b

If such legislation does exist, when was it enacted?

For questions 1a and 1b, an additional separate questionnaire was addressed to the State departments of education of the 48 States and the District of Columbia. Of these 49 questionnaires, answers were received from 43 States and the District.

This separate questionnaire was mailed primarily to determine if State policy had been formulated concerning the question of routine excusals. From the replies, it was learned that only California has legislation, enacted in 1951, which specifically authorizes the absence of the pupil from school for the purpose of having medical and dental services. Such absence is not deemed an absence in computing average daily attendance. This legal authorization may be found in the Education Code of California. The pertinent sections of the code, sections 6804 and 6806, are reproduced in the inset.

Although California is the only State with

Pertinent Sections in California Educational Code Relating to Authorized Absences

6804 Any absence of a pupil from school for the purpose of having an optometrical or medical service rendered which does not exceed 1 day or fraction thereof during each school month of 4 weeks shall not be deemed an absence due to illness under section 6803. (Added by Stats. 1951, ch. 228. In effect May 3, 1951.)

6806 No absence of a pupil from school for the purpose of having dental service rendered shall be deemed an absence in computing average daily attendance. (Added by Stats. 1951, ch. 228. In effect May 3, 1951.)

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specific legislation regarding this matter, 4 States—Massachusetts, Michigan, North Carolina, and Oregon—have formulations of policy. Briefly, this policy, as expressed in State department publications on school health services, and in inservice workshops for teachers and school administrators, may be stated as follows:

Children who need medical or dental care and who by necessity must make appointments with private physicians or dentists during the regular school hours should be accorded the same privilege as that enjoyed by children who, with the approval of school authorities, attend clinics; that is, excused without absence.

The vast majority of the remaining replies from the State departments of education stated that no legislation or policy at the State level exists concerning this matter and that the decision of excusing pupils during school hours lies solely within the discretion of the local board of education. At the same time, these many replies added that a very high percentage of the schools in their State do release children for medical and dental health visits.

Local Policies

After having reviewed the attitudes at the State level, it will be interesting to note local action. In this survey, it was found that in spite of recommended State policies concerning excused absences for health purposes, the local community takes such independent action as it sees fit. This finding is demonstrated by the fact that several boards of education oppose excusing children for medical or dental care even though the excused policy has been recommended by the State department of education.

Therefore, these practices are dependent on the local boards except in California where they are legislatively authorized. In this survey, even though 63 of the 94 reporting communities favor, with a positive attitude, the release of children during school hours for health services, only a relatively few localities have written established policies with regard to their release.

For the 63 boards of education reporting in the affirmative, the results were as follows:

12 replies, received from California school systems, indicate that local policies conform with State legislation.

11 replies included copies of official policy explaining how and why the policy came about.

40 replies stated that the school systems were following the policies recommended by the State board of education or that the policy was a local one, but they failed to mention whether the policy was an official one or whether it was merely a practice left to the discretion of the individual school principal.

The 11 cities which have adopted formal policies are Chicago, Cleveland, Dearborn, Mich., Erie, Pa., Evansville, Ind., Kansas City, Milwaukee, Providence, R. I., Sommerville, Mass., Tacoma, Wash., and Toledo, Ohio. It is interesting to note how these school policies developed. A description of plans existing in 5 of these cities will serve to illustrate.

The Chicago Plan

Chicago, for example, in 1949, on finding that it was impossible for 480,000 school children in need of dental care to have their teeth treated on Saturdays and after school hours, developed a plan permitting excusals from school for dental care, which is "so essential to their physical, social, and scholastic welfare." This plan permitted excusals under certain regulations and upon the approval of the principal of the school. All members of the Chicago Dental Society received copies of a statement of the plan and the forms. It was suggested to the dentists that when more than one appointment must be made during school hours, the appointment schedule (time and day of week) be staggered and when necessary the dentist should make it possible for the teacher or the principal to change the appointment hour upon reasonable notification. It was pointed out that the success of this plan would depend on the cooperation of the parent, the dentist, and the school authority.

The Evansville Plan

Early in the school year 1947–48, the superintendent of schools in Evansville, Ind., appointed a committee to formulate a policy between the medical and dental societies regarding excusing children for appointments during

school. And, in October 1947, the policy was formulated according to the following plan:

That a written request be received from the parent.

That the principal verify the appointment with the physician or dentist.

That the child obtain a written statement from the dentist or physician saying that the child has filled the appointment at the allotted time. The schools, dentists, and physicians agreed to cooperate in attempting to make as many appointments as possible during the summer, school holidays, Saturdays, and after school.

The Providence Plan

Providence, R. I., has adopted a plan now in operation which limits excused absences from school for appointments with a private dentist to six appointments in each term. "Each pupil is to have an appointment card to show that an appointment has been made." The same number of excused absences are applicable for visits to the Joseph Samuels Dental Clinic in Providence.

The Dearborn Plan

The Dearborn, Mich., public school system, in its "Revised Statement Relative to Policies Concerned with Excusing Students from School for Outside Activities" took into consideration the various types of excusal requests generally received. On May 8, 1953, it decided that requests to have pupils excused for vacations, shopping, payment of bills, care of younger children, and so forth are to be discouraged; that pupils are not to be excused for private music and dancing lessons; and that excuses for activities of outside organizations may be authorized at the discretion of the school principal. Finally, requests to have pupils excused for dental and medical appointments are to be honored.

The Kansas City Plan

A policy of excusing children during school hours for a dental appointment was formulated as early as September 1942 by the Kansas City Board of Education. This policy, still in operation, was developed "in the interest of public health and made necessary by the war emergency."

Question No. 2

Does your board of education have specific forms for private medical or dental appointment service?

Of the 63 replies favoring the release of children for this purpose, 32 were negative, or, "No regular form is used, a note usually suffices," or, "Some dentists and physicians have their own forms."

The remaining 31 replies each enclosed a form that is in current use. Representative samples of the 31 forms received may be seen in figures 1 and 2. These samples were chosen to point out the complexity of one type of form (fig. 1) and the simplicity of another (fig. 2).

For the most part, all 31 forms contain, essentially, the same data. On the reverse side of a majority of the forms appears a statement which either discusses the procedure for making these appointments during school hours or stresses the need for cooperation.

Question No. 3

In the event of permitted absenteeism during the school day for health service, are provisions made for transporting the child to and from the private practitioner's office?

Of the 63 favorable replies to the first question, in only one instance was it reported that the board of education transported the children to the offices of private physicians or dentists and then only when it was impossible for the parent to do so. However, many school systems reported transporting children to clinics.

Question No. 3a

If not, does the board of education assume any responsibility for injury to a child on authorized absence for this purpose?

This question was inserted to determine whether valid argument existed against the release of children since a board of education might be held liable for injury to a child. All of the 63 boards of education permitting the release of children during school hours reported

that the board assumes no responsibility for injury to a child in these cases. Such responsibility belongs wholly to the parent or guardian.

Question No. 4

Is authorized absence from school for health service deemed an absence in computing average daily attendance in order to secure apportionment from State school funds?

This question, too, was inserted to determine whether valid objection to releasing children existed on the premise that such policy would affect State school funds. Of the 63 affirmative replies received to question No. 1, 43 stated, "No"; 13 replied, "Only if the child is absent for more than a half school day"; 7 replied, "Yes."

Several of the "Yes" replies were obvious errors in understanding the question since other indications, State law (in California, for example) or State department of education policy, are to the contrary. However, one community specifically stated, "Yes, children are counted absent." Another stated, "Yes, a pupil is either actually present or absent from school."

In essence, the vast majority lose no funds from State sources with regard to this matter, provided the child first reports to school and is then dismissed or attends an early morning health appointment and then reports to school. In some States, State school funds are allocated on the basis of average membership and not on daily attendance.

In many instances where the child is absent all day, apportionments from State school funds are lost; however, it is unreasonable for a child to be absent for that length of time in order to receive private medical or dental care. It may be assumed that where policy to the contrary exists—that a child may not leave school during school hours—just such absences are

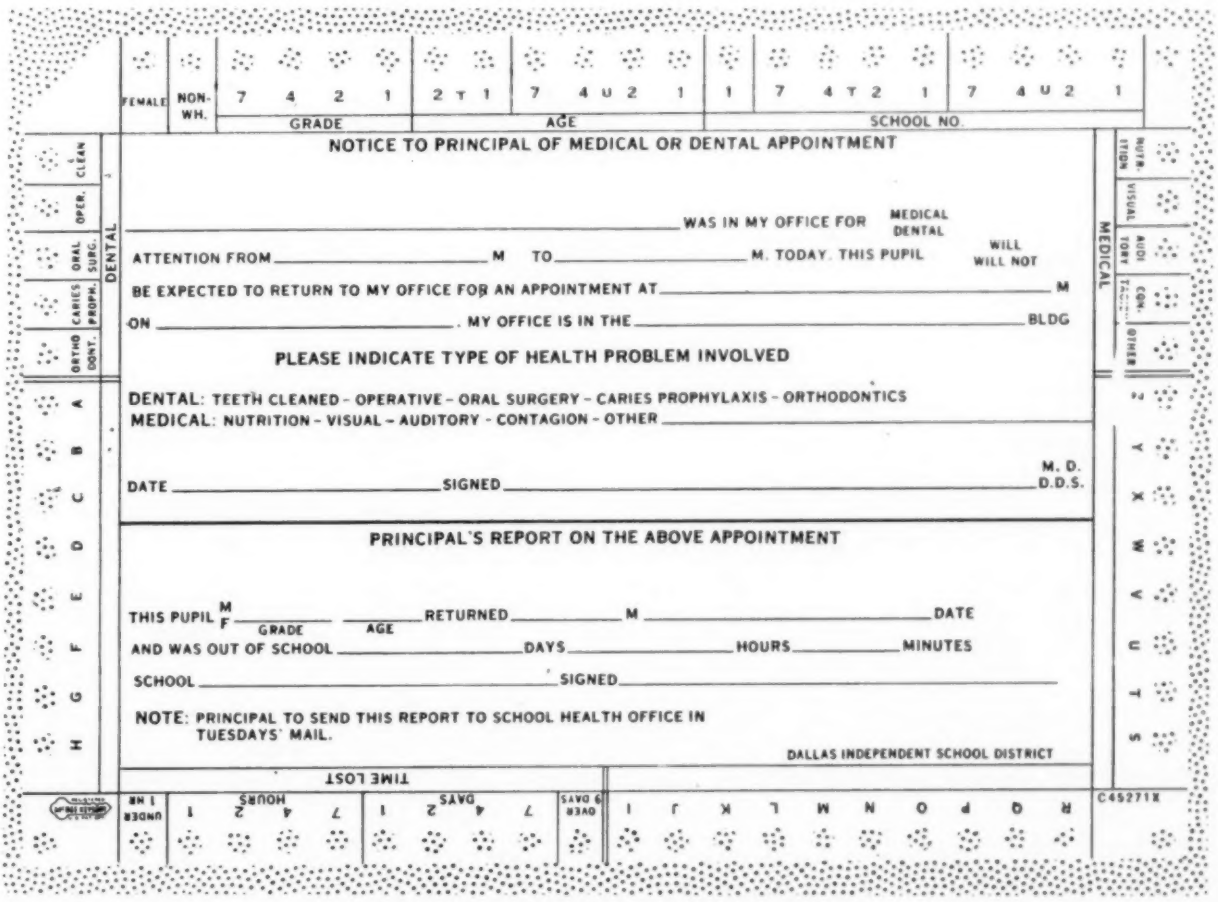
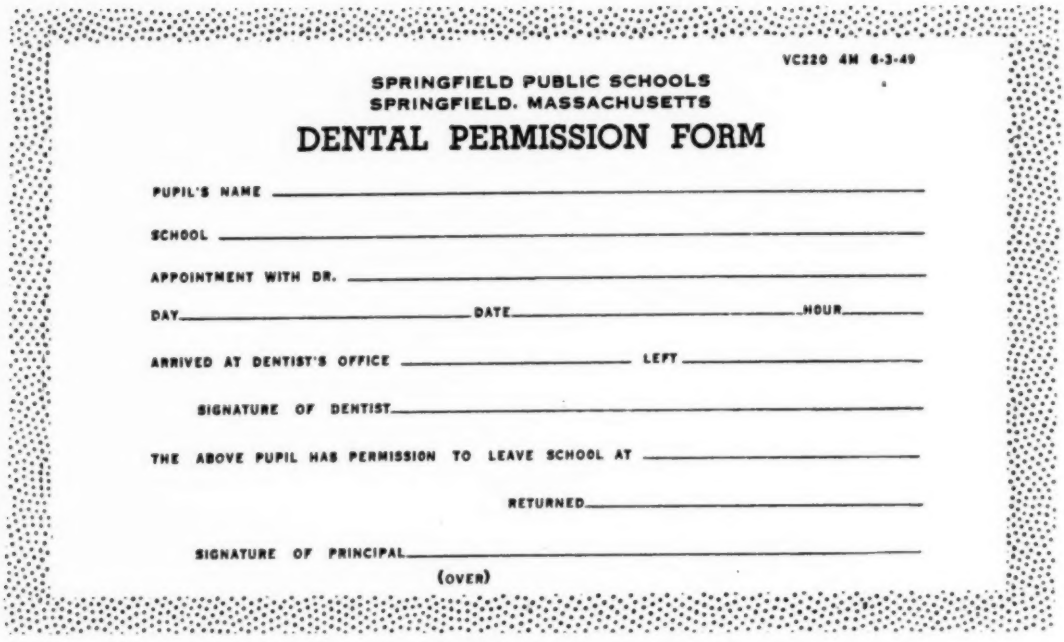

FEMALE
NON-WH.
GRADE
AGE
SCHOOL NO.
NOTICE TO PRINCIPAL OF MEDICAL OR DENTAL APPOINTMENT
WAS IN MY OFFICE FOR MEDICAL DENTAL
ATTENTION FROM M TO M. TODAY. THIS PUPIL WILL WILL NOT
BE EXPECTED TO RETURN TO MY OFFICE FOR AN APPOINTMENT AT M
ON . MY OFFICE IS IN THE BLDG
PLEASE INDICATE TYPE OF HEALTH PROBLEM INVOLVED
DENTAL: TEETH CLEANED - OPERATIVE - ORAL SURGERY - CARIES PROPHYLAXIS - ORTHODONTICS
MEDICAL: NUTRITION - VISUAL - AUDITORY - CONTAGION - OTHER
DATE SIGNED M. D. D.D.S.
PRINCIPAL'S REPORT ON THE ABOVE APPOINTMENT
THIS PUPIL M F GRADE AGE RETURNED M DATE
AND WAS OUT OF SCHOOL DAYS HOURS MINUTES
SCHOOL SIGNED
NOTE: PRINCIPAL TO SEND THIS REPORT TO SCHOOL HEALTH OFFICE IN TUESDAYS' MAIL.
DALLAS INDEPENDENT SCHOOL DISTRICT
TIME LOST
DENTAL
MEDICAL
C45271X

Figure 1. Some forms are complex.



VC220 4M 8-3-49

SPRINGFIELD PUBLIC SCHOOLS
SPRINGFIELD, MASSACHUSETTS

DENTAL PERMISSION FORM

PUPIL'S NAME _____

SCHOOL _____

APPOINTMENT WITH DR. _____

DAY _____ DATE _____ HOUR _____

ARRIVED AT DENTIST'S OFFICE _____ LEFT _____

SIGNATURE OF DENTIST _____

THE ABOVE PUPIL HAS PERMISSION TO LEAVE SCHOOL AT _____

RETURNED _____

SIGNATURE OF PRINCIPAL _____

(OVER)

Figure 2. Other forms are simple.

occurring. In other words, since the child may not leave school in order to keep a private appointment, he is kept from school for the entire day by his parent on the premise that he is not well.

Question No. 5

As an administrator, do you have any objection to excusing a child from school to receive private medical or dental attention?

Question 6 on the questionnaire consisted of a space for "remarks." Replies to questions 5 and 6 are considered together since in most instances the administrator completing the questionnaire made no differentiation between the two questions.

For the 63 communities releasing children, the following quotation may be used to sum up the replies to questions 5 and 6:

"It is the feeling of our administration that today's modern dentists and physicians do considerable health education at the time of these dental and medical appointments. At this time, the child is most receptive to learning, a time when he is actually experiencing something himself. Therefore, it is our feeling that more frequently than not the child may actually learn more about health education, as well as get the needed medical or dental attention, in a physician's or dentist's office than he would in the classroom."

Several replies to questions 5 and 6 mentioned the dangers of abuse to such a program on the part of the dentist or physician, the child, or the parent, and commented that in addition there is a loss to the child of education time, as well as some resulting confusion in the administration of such a program. However, despite the acknowledgment of these dangers, these administrators stated that abuses of the privilege are unusual and that there has been little complaint about excessive absences.

From among the 31 additional replies, those constituting the "no's" and the "sometimes" to the releasing of children during school hours, the following statements were included in reply to questions 5 and 6:

"I can see no reason for permitted absenteeism during the school day except in cases of extenuating circumstances. I believe that a policy to the contrary would constitute an invitation to the parents to view lightly the importance of regular school attendance."

"We do not believe that a child's health status should be maintained at the expense of his education."

"If the child is a paying patient, he should

not be forced to sacrifice his school time any more than paying adult patients should be forced to sacrifice business hours except in emergency situations."

Summary and Conclusions

The purpose of this paper has been twofold:

To point out some of the factors that need to be considered in assaying the problem of excusing children from school during school hours in order to receive routine private dental care.

To ascertain existing practices in boards of education, nationally, as it pertains to this matter.

Questionnaires were mailed to all cities in the United States with populations of over 90,000. Of the 125 questionnaires, 94 replies were received. Fully two-thirds of those reporting (63) authorized the practice of excusing children for dental health purposes. Seventy-five percent of the questionnaires were returned completed, many with an accompanying letter offering additional information demonstrating much interest in this subject.

It was learned that the State of California has specific legislation authorizing unlimited absenteeism for dental health appointments and that several States have formulated such policy at the State level worked out jointly between the State department of education and the State department of health.

From the 63 replies, it was learned that 23 boards of education have formal written policy permitting private dental care during school hours. With two exceptions the remaining boards have developed this formal policy since 1949—which demonstrates somewhat the growing recognition of the importance of good oral health.

The problem of excusing children during school hours has many facets, and no one solution is applicable to every community. Certainly, in considering this problem, thought should be given to the following:

The age of the child.

The threshold of the child's fatigue.

The DMF index of the community. (The DMF index is the mean number of decayed, missing, and filled teeth per person; it is a useful tool in measuring dental health conditions.)

The amount of effective demand for dentistry.

The number of dentists practicing dentistry for children.

The time, distance, and transportation factors involved between the school and the private dentist's office.

The availability of dentists who are interested in children's dentistry; and

The ratio of dentists to the general population.

The health and welfare of the child is of primary consideration, and his best interest must be served. Only by the educator's understanding of the problems associated with children's dentistry and only by the dentist's understanding of the problems associated with educational interruptions can a solution be found that will work to the best advantage of the child.

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Multiple Screening Pilot Study

—Report of the Indianapolis, Indiana, Project—

By BENJAMIN E. CARROLL, M.A., ARNOLD B. KURLANDER, M.D., and HENRY G. NESTER, M.D.

A PILOT STUDY of the multiple screening case-finding technique was conducted in Indianapolis, Ind., from January 1950 through August 1952, to determine the kind and amount of disease discoverable by this method and, at the same time, to examine the feasibility of using the technique in a permanent health center setting. The study was carried out through the joint efforts of the city health department, the Indiana Department of Health, the Public Health Service, and Flanner House, a community center in Indianapolis designed primarily to serve the Negro population of the city.

Study Population and Procedures

The screening project was located in the Herman G. Morgan Health Center, a modern, well-equipped facility which serves as a city health department clinic and center for the dissemination of health information. Although the center is available to anyone in the city, the majority of the persons who come there for service live nearby.

Screenees were drawn from census tracts in Indianapolis that account for all but 2 percent of the city's Negro population. Area of residence (census tract) was entered on the screenee's record for only 1 year of the project, June 1, 1951, through May 31, 1952. During this time, 1,344 Negroes were screened, which was 2.1 percent of the Negro population of Indianapolis in 1950. In the 2 census tracts immediately surrounding the health center, 2.4 percent of the Negro population was screened; in the areas relatively near the center 2.5 percent was screened, and in the outlying areas 1.5 percent was screened. For the duration of the project, it is estimated that approximately 8 percent of the Negroes in Indianapolis received the tests.

Although no general public announcement of the project was made, considerable door-to-door visiting was done. Most screenees, however, were recruited by talks to various community groups. About 82 percent of the screenees came in through such efforts; the remainder were persons who needed health certificates in order to work.

During the project, 5,711 persons were screened. The age, race, and sex of the screened population are given in table 1.

Mr. Carroll, analytical statistician at the National Cancer Institute, Public Health Service, since July 1953, was formerly statistician with the Chronic Disease Program, Division of Special Health Services. Dr. Kurlander is acting chief of the Chronic Disease Program. Dr. Nester is director of public health, Board of Public Health and Hospitals, Indianapolis, Ind.

All persons screened were tested for the conditions and by the tests listed in table 2. Table 3 shows the results of screening and retesting, together with the number of persons referred for further diagnostic work. Of the 5,711 persons screened, 3,102 were referred for 6,474 conditions, and 2,420 persons were referred for 2,743 conditions other than weight, vision, or hearing. The latter figures represent 1.13 conditions per person referred.

Table 1. Composition of population screened: race, sex, and age

Age (years)	Negro			All races		
	Male	Female	Total	Male	Female	Total
16–34 [1]	611	1, 613	2, 224	676	1, 738	2, 414
35–54	563	1, 458	2, 021	656	1, 646	2, 302
55–74	318	502	820	348	579	927
75–88	31	25	56	35	31	66
Unknown	0	0	0	2	0	2
Total	1, 523	3, 598	5, 121	1, 717	3, 994	5, 711

[1] Persons under 16 years of age were not screened.

When only tests for weight or vision were positive, the screenee was usually advised by letter to seek medical advice or care, although some overweight screenees were referred to the health center nutritionist for advice. If other tests were positive, screenees were requested to return for retesting usually 8 days after the initial tests. When both the original test and the retest were positive, the screenee was advised to see his personal physician or to visit a public clinic for diagnosis and, if necessary, medical care.

Followup Methods

When referral was made, a complete transcript of both screening and retesting results was forwarded either to the physician or to the appropriate public clinic. A report card was sent with each transcript, with the request that it be returned with a record of diagnosis and disposition of the case. The city health department checked all referrals for tuberculosis and syphilis, and records of final diagnosis of these two diseases were therefore available. For the noncommunicable diseases, however, results of diagnosis had to be obtained from the physicians to whom screenees were referred. Since the returns were not adequate for a valid evaluation of the results of referral, it was necessary to develop a method of followup which would attain this objective and which might be generally applicable elsewhere.

Concentrated followup of referrals by personal visit was therefore directed to the 3 public clinics and the 7 private physicians having the largest volume of referrals and to all persons in whom diabetes or kidney disease was suspected, regardless of where the diagnostic procedures were carried out. This task was handled by a worker familiar with the screening project and with an understanding of the information necessary for meaningful analysis. The method yielded 100-percent reporting on a group of 1,365 persons referred for diagnostic procedures.

There was a possibility that selection of physicians on the basis of volume of referrals might introduce a bias into the data so that the followup group would not be a representative sample of the screenees as a whole. It was possible to make a test for this type of bias, however, since the volume of cases also varied among the 17 physicians selected. Reports from the 7 physicians with the most referrals were compared with one another and with reports from the other 10 physicians as to important aspects of diagnosis and disposition. Tested on this basis, the reports were found to be quite homogeneous. Comparison of age distributions was also made between persons in the followup group and other screenees. Again, no significant difference was found. Thus, within the limitations of the data available for statistical testing, no bias was discovered which would make the followup sample unsuitable for use as a basis for estimates.

In the sample followup group of 1,365 persons, 19.4 percent failed to go to a physician or clinic; 2.4 percent reported to physicians but no definitive diagnosis was made; and diagnostic reports were received for 78.2 percent of persons referred. One or more conditions were confirmed for 70 percent of the group, and 21 percent, or 283 persons, had previously unknown diseases diagnosed.

Table 2. Screening and retesting procedures

Screening procedure	Technique	Criterion for positivity	Retesting
Height-weight-body build measurement.	First method: Height and weight with shoes on but without outer clothing.	10 percent below or 30 percent above normal range of life insurance company table of ideal weights for small, medium, and large frame (as judged), for age 25 years and over.	Not routinely done.
	Pryor method [1] (adopted later): Lateral thoracic diameter and bi-iliac diameter used to determine body build.	Weight expressed as percentage of Pryor standard; limits of normal, 77.5 percent and 121.5 percent.	Not routinely done.
Chest X-ray	70-mm. film	Judgment of radiologist, reading for tuberculosis, heart disease, and other chest pathology.	14″ x 17″ film (not routine for cardiac abnormality alone).
Cardiovascular tests done by a physician:			
History	Questions covering chest discomfort, dyspnea, orthopnea, or rheumatic fever and/or history of heart disease or hypertension.	(Screenees not referred on basis of positive history alone.)	Not routinely done.
Blood pressure	Sitting position, standard mercury manometer.	Over 150 mm. systolic and/or 90 diastolic.	Same method and standard.
Auscultation	Brief check for evidence of possible heart disease.	Judgment of examining physician.	Not routinely done.
Hearing test	Each ear tested with pure-tone audiometer at 500, 1,000, 2,000, 4,000, and 8,000 cycles.	30 decibels; 1 failure in each ear or 2 failures in 1 ear.	Complete audiogram; average threshold above 30 decibels in either ear considered abnormal.
Urine specimen obtained for:			
Urine albumin test	Heller ring test	Trace or more	Same method and standard.
Urine sugar test	Clinitest	Trace or more	Same method and standard.
Blood specimen taken by venipuncture for:			
Blood sugar	Wilkerson-Heftmann tablet method, done manually.	Initially 180 mg. percent; later lowered to 130 mg. percent; no account taken of food eaten.	Same method at 180-mg. level, 1 hour after ingestion of 50 gm. glucose.
Serologic test for syphilis.	Mazzini qualitative	Doubtful or positive	Same method, done by city laboratory, quantitated if positive.
Hemoglobin	Sheard and Sanford photoelectrometer	Under 11.0 gm. per 100 cc. for women; under 12.5 gm. for men.	Same method and standard.
Visual acuity test	Sight screener (American Optical Co.), 6 acuity test.	2 tests 20/40 or poorer or 1 test 20/50 or poorer.	Same method and standard.

[1] Pryor, Helen B: Width-weight tables. Ed. 2. Revised. Stanford University, Calif., Stanford University Press, 1940.

Table 3. Results of screening and retesting, and number of persons referred for further diagnostic work

Test or condition	Screening test			Retesting			Persons referred	
	Number persons screened	Number (positive)	Percent (positive)	Number persons retested	Number (positive)	Percent (positive)	Number	Percent of total screened
All	[1] 5,711	4,283	75.0	3,007	2,639	87.8	3,102	54.3
Cardiovascular	5,711	1,802	31.6	1,395	1,106	79.3	1,094	19.2
Blood pressure	5,711	1,465	25.7	1,375	1,024	74.5	----	----
History	5,706	1,756	30.8	3	3	----	----	----
Auscultation	5,709	286	5.0	26	17	65.4	----	----
X-ray	5,701	675	11.8	28	28	100.0	----	----
Diabetes	5,708	147	2.6	131	98	74.8	117	2.0
Blood sugar	5,695	127	2.2	114	87	76.3	----	----
Urine sugar	5,704	113	2.0	101	87	86.1	----	----
X-ray (tuberculosis)	5,701	98	1.7	74	64	86.5	90	1.6
Miscellaneous chest pathology	5,701	153	2.7	72	40	55.6	87	1.5
Hemoglobin	5,694	923	16.2	492	381	77.4	538	9.4
Mazzini	5,684	709	12.5	682	547	80.2	702	12.4
Urine albumin	5,701	125	2.2	101	57	56.4	81	1.4
Overweight [2]	4,108	656	16.0	5	4	----	655	15.9
Underweight [2]	4,108	245	6.0	2	1	----	244	5.9
Overweight [3]	1,602	137	8.6	1	1	----	137	8.6
Underweight [3]	1,602	22	1.4	0	0	----	22	1.4
Vision	5,697	2,534	44.5	1,737	1,373	79.0	2,173	38.1
Hearing	5,650	1,120	19.8	1,059	437	41.3	500	8.8
Other [4]	5,711	47	.8	2	2	----	34	.6

[1] Includes only the original screening for those persons screened more than once. [2] Based on life insurance tables. [3] Based on Pryor measurements. [4] Miscellaneous conditions observed by the physician in charge.

Results

The results of the project in terms of confirmation of screening results and of previously unknown cases discovered are presented in table 4. Shown are the number of persons referred for each condition and the number of cases, both new and old, diagnosed as a result of the screening of 5,711 persons. The numbers of cases of cardiovascular disease, anemia, and "other diseases" are estimated on the basis of the sample findings.

Table 4 also shows that 1,612 positive diagnoses, including 474 newly discovered conditions, resulted from the screening and referral process, a ratio of 8.3 newly discovered conditions for every 100 persons screened. The per-

Table 4. Screenees referred, positive diagnoses, and new cases, according to disease for which referred

Disease for which referred	Number persons screened	Persons referred for diagnosis		Positive diagnoses		Previously unknown cases	
		Number	Percent	Number	Percent	Number	Percent
Anemia	5,694	[1] 538	9.4	[1] 220	3.9	[1] 96	1.7
Cardiovascular disease	5,711	1,094	19.2	[1] 646	11.3	[1] 177	3.1
Diabetes	5,708	117	2.0	66	1.2	25	.4
Kidney disease	5,701	81	1.4	33	.6	10	.2
Syphilis	5,684	702	12.4	541	9.5	118	2.1
Tuberculosis	5,701	90	1.6	58	1.0	23	.4
Active	----	----	----	*22*	*.4*	*17*	*.3*
Other diseases	5,711	121	2.1	[1] 48	.8	[1] 25	.4
Total	5,711	2,743	----	1,612	----	474	----

[1] Estimated on basis of followup sample.

Table 5. Cases of cardiovascular disease diagnosed in the special followup group of 336 persons

Diagnosis	Number of cases	Newly discovered cases	
		Number	Percent
Total	378	107	28.3
All heart disease	167	38	22.8
Hypertensive heart disease	77	17	22.1
Arteriosclerotic heart disease	37	12	32.4
Syphilitic heart disease	8	0	
Rheumatic heart disease	9	1	
Other heart disease	36	8	22.2
All vascular disease	211	69	32.7
Hypertension [1]	175	56	32.0
Arteriosclerosis	34	13	38.2
Other vascular disease	2	0	

[1] All diagnoses of hypertension, with or without mention of heart disease, but exclusive of hypertensive heart disease.

centage of screenees referred for diagnosis ranges from 1.4 for kidney disease to 19 for cardiovascular disease. The percentage with confirmed diagnoses ranges from 0.4 for active tuberculosis to 11.3 for cardiovascular disease. The percentage with new cases ranges from 0.2 for kidney disease to 3.1 for cardiovascular disease.

Because of the importance of cardiovascular disease, the principal types diagnosed and the number and percentage of previously unknown cases in the special followup group are shown in table 5. Cases of hypertension numbered 175; of hypertensive heart disease, 77. Twenty-eight percent of all cardiovascular disease diagnoses were previously unknown. Nearly a third of the cases of hypertension and of arteriosclerotic heart disease were new cases.

Summary

1. A multiple screening project was conducted from January 1950 through August 1952 in Indianapolis, Ind., through the cooperative efforts of the city health department, the State health department, the Public Health Service, and Flanner House. The project was designed to determine the kind and amount of disease discoverable by the multiple screening case-finding technique and the feasibility of using such a technique in a permanent health center setting.

2. During the project 5,711 persons were screened; 3,102 persons were referred for a total of 5,611 conditions.

3. Concentrated followup of referrals was undertaken by visits to 17 physicians and 3 public clinics in order to secure 100-percent reporting on a definite segment of referrals. The followup worker also visited physicians and clinics to whom diabetes and kidney disease suspects were referred in order to secure 100-percent reporting on these conditions. The city health department checked all referrals for tuberculosis and syphilis. No followup was undertaken on referrals for weight, vision, or hearing.

4. A significant number of new cases were discovered; the number amounting to 8.3 cases per 100 persons screened. The diseases discovered included such serious conditions as cardiovascular disease, active tuberculosis, diabetes, syphilis, and kidney disease.

Poliomyelitis in the United States, 1953

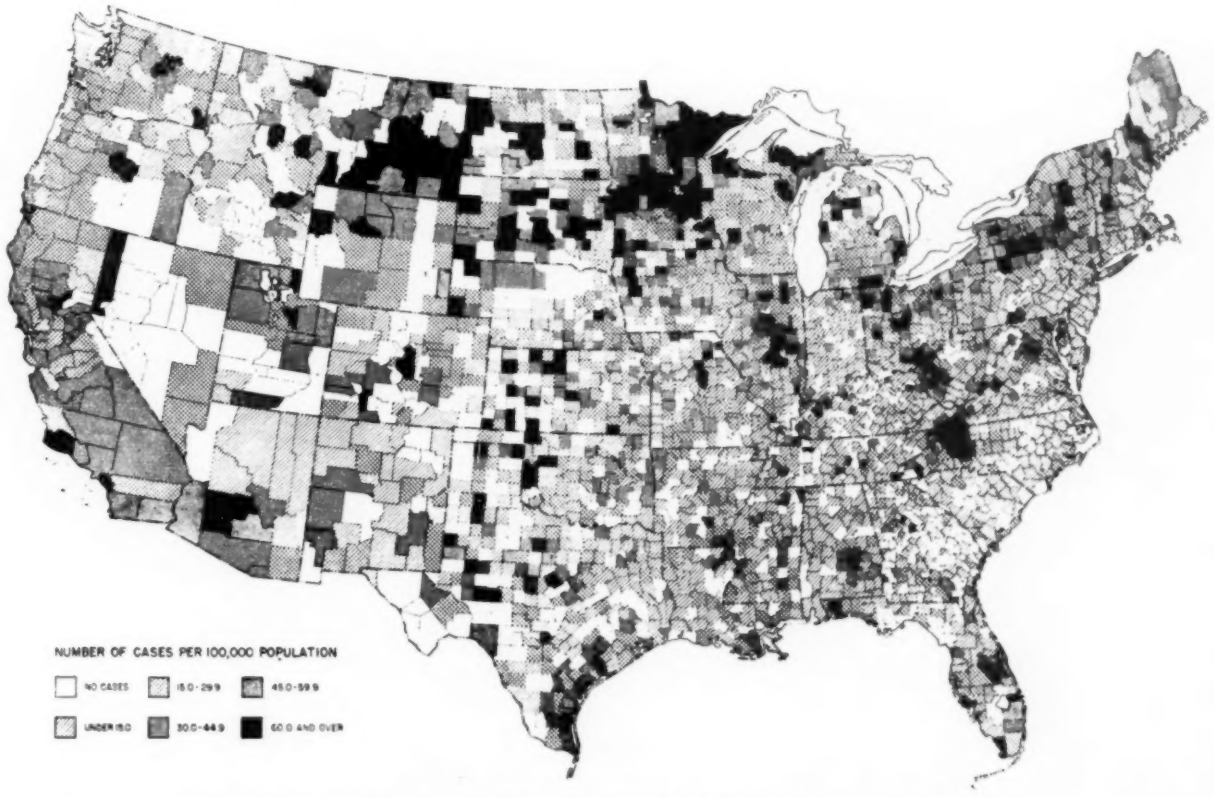
The number of poliomyelitis cases reported in the United States in 1953 was 35,592, approximately 40 percent below the number for 1952. The estimated death rate in 1953, based on a 10-percent sample, was 1.1, a similar decrease for mortality as for incidence. The numbers of cases reported, case rates, and death rates per 100,000 population for the 5-year period 1949–53 are shown below.

Dr. C. C. Dauer, medical adviser of the National Office of Vital Statistics, Public Health Service, continues the annual report series on poliomyelitis in the United States. The map accompanying this report was prepared under the supervision of Ida L. Sherman, Communicable Disease Center, Atlanta, Ga.

	Number cases reported	*Case rate*	*Death rate*
1953	35, 592	22. 5	[1] 1. 1
1952	57, 879	37. 2	2. 0
1951	28, 386	18. 5	1. 0
1950	33, 300	22. 1	1. 3
1949	42, 033	28. 3	1. 8

[1] Estimated.

The following States reported the largest number of cases in 1953: California 4,078 cases;



Distribution of poliomyelitis in the United States by county, 1953.

New York 2,984; Ohio 2,635; Michigan 2,346; and Minnesota 2,254. However, the States with the highest rates of incidence were: Minnesota with a rate of 73.9 cases per 100,000 population; Arizona 45.2; Montana 40.6; Maine 35.9; and Rhode Island 35.5. In 1952 the rates for the five States with the highest incidence were far in excess of those for 1953. In 1952 Nebraska had the highest rate with 166.9; South Dakota 154.1; Minnesota 137.1; Iowa 137.0; and Kansas 87.2.

Of the 35,592 cases in 1953, 44 percent were reported as paralytic, 34 percent nonparalytic, and in the remaining 22 percent, the type of disease was not stated. In 1952 the proportions were 37 percent paralytic, 22 percent nonparalytic, and 41 percent unspecified.

The distribution of cases by counties for 1953 is shown in the accompanying map. This shows a number of localized areas of high incidence particularly in the northern part of the country. The most extensive areas were in Minnesota and Montana. Some epidemic areas involved adjoining counties of two or more States. One area was located in western North Carolina, eastern Tennessee, and southwestern Virginia. Another area included counties in southern Ohio and western West Virginia.

For Parents' Information

Six illustrated leaflets for parents have been issued by the Children's Bureau, Department of Health, Education, and Welfare.

The titles are: Your Children's Feet and Footwear; The Child With a Cleft Palate; The Child With Cerebral Palsy; The Child Who Is Hard of Hearing; The Preschool Child Who Is Blind; and The Child With Epilepsy.

One of the series, Your Children's Feet and Footwear, stresses the importance of fitting shoes to feet, rather than feet to shoes. Illustrations show desirable types of shoes for children at different stages. Parents are cautioned against indiscriminate use of X-ray machines as a means of determining a good fit in children's shoes.

Copies of the leaflets may be purchased, for 10 cents each, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Toward Sensible Rehabilitation Of the Alcoholic

By ANTHONY ZAPPALA, M.D., and FRANK S. KETCHAM, A.B., LL.B.

A DRAMATIC DEVELOPMENT over the last 20 years has been the emergence of alcoholism as a disease and public health problem. Within the memory of most Americans, the excessive use of alcoholic beverages, whatever its manifestation, has been regarded variously as a moral deviation, a misdemeanor, or a joke, depending on the point of view. Drunkards—the term "alcoholic" was little used—were thought of as perverse creatures, caught in a situation of their own making, whose natural habitat was the gutter, jails, flophouses, and the like. Twenty years ago, the concept of alcoholism as an illness found little acceptance. Society's attitude toward alcoholism was similar to society's attitude toward the psychoses until the late 18th century, when it was finally realized that the management of major personality disorders properly belongs in the medical field. Today, we are witnessing the same development with respect to alcoholism.

The founding of Alcoholics Anonymous in 1935 and the establishment of pilot clinics beginning with the Yale plan clinic in 1945 (*1*) threw new light not only on the nature of alcoholism but on its extent as a health problem. The new methods of treatment have been freely and eagerly embraced by thousands of persons who are far removed from the usual concept of "skid row" drunk but who nevertheless know and fear the effects of compulsive drinking. The majority of alcoholics do not belong to the submerged or social outcast group but are ordinary people, working, living in a family group, grappling with the day-to-day exigencies of life which for them center around a problem with alcohol.

Dr. Zappala is the director of the alcoholic rehabilitation division, District of Columbia Department of Public Health, and assistant clinical professor of psychiatry, Georgetown University, Washington, D. C. Mr. Ketcham is a practicing attorney in the District and a member of the mental health committee of the District of Columbia Bar Association. Both authors have contributed articles to scientific journals, Dr. Zappala on the subject of alcoholism, and Mr. Ketcham on political, legal, and sociological subjects. Miss Mary K. Nesbit, an associate of Mr. Ketcham, assisted with technical research.

The Nature of the Problem

What is this problem of alcoholism?

The medical definition, which is gradually finding its way into the law, describes the alcoholic as a person who has lost control of the practice of drinking alcoholic beverages to an extent that his interpersonal, family, or community relationships have become seriously threatened or disturbed. The alcoholic drinks because in him exists an urgency in the form of tension, anxiety, or depression which irrationally drives him to alcohol and its excessive use. He drinks not to make reality more pleasant but to escape from reality. As a rule, the alcoholic hates liquor and hates himself for suc-

cumbing, but he cannot stop without help (*2*).

Selden D. Bacon (*3*) considers the alcoholic's drinking as compulsive as the behavior of the kleptomaniac or the continual handwashing of a compulsive neurotic. Compulsive drinking is a progressive condition, and the course may be rapid or very slow. The drinking behavior is a symptom of some inner maladjustment which the alcoholic cannot understand and cannot control. It is safe to say that the alcoholic's difficulties were seeded before he ever tasted alcohol.

Obesity is not caused by the availability of food, and, by the same token, alcoholism is not caused by the mere availability of liquor. It is a much more complex resultant of multiple interacting factors—biological, social, psychological, and cultural—which have combined to produce a personality disorder.

We now know that alcoholism is a public health problem, as much so as tuberculosis. It is estimated that there are 3,800,000 alcoholics in the United States, of whom 36,900 are located in the District of Columbia (*4*). Each year the monetary costs of alcoholism in terms of potential wage losses, accidents, hospital care, jail maintenance, and so forth, run into millions of dollars—$778,903,000 annually on a national basis, according to a recent estimate (*5*). And in the District of Columbia alone, more than $1 million is expended each year in the mere maintenance of alcoholics in the jail and workhouse.

In addition, and more importantly, alcoholism untreated leads to intangible costs which cannot be reckoned—the breakup of families, the dulling of fine minds, the warping of attractive personalities. This is borne out by case histories selected from records of the alcoholic rehabilitation division of the District of Columbia Department of Public Health, a few of which are briefly outlined below:

CASE 1. Female, 38 years of age, recently divorced. Cultured, widely traveled, above average in intelligence and personal charm, but markedly lacking in mature self-confidence. Very dependent. Alcoholism has long been a disrupting force in her life. Last year she was sober 3 months; drunk 6 months; spent 3 months in mental hospitals. Currently, she is serving her first sentence in the workhouse. This patient is poorly motivated but has sufficient insight to be aware of her desperate situation. She would accept treatment in an institution for alcoholics if facilities were available.

CASE 2. Male, 31 years of age, separated from his wife and child. Tall, strongly built, Viking type. By temperament, sensitive, perceptive, artistic. Displays considerable talent for self-expression through the medium of painting. Good general education, unusually well informed about many things, but not professionally trained. Frustration threshold is low, and he refuses to stick to humdrum, routine jobs. Not a chronic court repeater, but is now serving a sentence at the workhouse. Has qualities which should enable him to respond well to psychotherapy in a protected environment.

CASE 3. Female, 45 years of age, divorced. She fought the divorce suit vigorously but was unsuccessful, losing custody of her much loved only child and even visitation rights, which are granted sparingly. Throughout the marriage she contributed materially to the home, holding responsible positions as executive secretary in which she took great interest. She has been arrested for drunkenness, has served sentences, and in therapy speaks frequently of the traumatic effect of her first arrest. She still drinks—consistently and sometimes heavily. Her physical and psychological handicaps are such that only prolonged treatment in a sympathetic and protected environment would be helpful.

CASE 4. Male, 35 years of age, divorced. Skilled mechanic. Suffers from an obscure nervous condition which leads to compulsive drinking. Now far advanced in chronic alcoholism; value system completely undermined; physically deteriorated. Spends his time on circuit between the clinic, jail, workhouse, and municipal hospital. Prognosis for recovery of physical and mental health very poor without long-term treatment.

CASE 5. Female, 30 years of age, divorced 5 years ago after an early, unsuccessful marriage. Has a delicate prettiness of face and figure, like a Dresden china doll. College trained and qualified as a medical technician. She has a deeply rooted desire for oblivion. For this reason, and also, because of the stigma attached to the use of alcohol by a woman, she has turned to barbiturates or "sleeping pills," which when taken in excessive quantities produce the same effects as alcohol. Her problems are, of course, intensified by this additional addiction, which is even more dangerous and difficult to arrest than the alcohol habit. She has had no contact with the police, the family having extended itself to provide expensive hospital care, thus far to little avail. This patient needs additional treatment under close supervision in a protected environment.

CASE 6. Male, 39 years of age, unmarried. Has been a successful attorney. Arrested 80 odd times for intoxication. Has had brief contacts with the clinic, but since he spends practically all of his time at the workhouse, psychiatric diagnosis and treatment have not been possible.

Such examples, which are not unusual, show the compulsive nature of excessive drinking. Would any well-adjusted individual deliberately waste his abilities and "with malice aforethought" subject himself to the hardships which have been described?

We are living in a period of transition insofar as legislation on alcoholism is concerned. The situation in the District of Columbia is typical of the situation as it exists in almost every large city in the land. Two major statutes in the District deal with drunkenness and alcoholism—statutes which are in conflict. One treats public intoxication as a misdemeanor and prescribes penalties (*6*). The other embodies the modern concept of alcoholism as a disease and sets up a program for rehabilitation (*7*). These two approaches—the old and the new, the penal and the nonpenal—are operating side by side in the District, and in other cities as well, with results that are gratifying in some respects but on the whole are frustrating and incongruous.

Let us examine the situation in the District of Columbia. In this way, we may gain a view of the general situation, for the same conditions obtain everywhere, statistics forming the only material difference.

Failure of the Penal Approach

Alcoholism has been regarded traditionally as a penal problem, and efforts have been made to control it by punitive measures. The District of Columbia statute—act of Congress approved 1934, as amended (*6*)—is typical. After providing that no person shall be drunk or intoxicated in any public place, it prescribes penalties: a fine of not more than $100 or imprisonment for not more than 90 days, or both.

It is estimated that not more than 10 to 20 percent of the alcoholic population ever comes in contact with the police. The rest are the hidden alcoholics—the ones who drink quietly and alone or who are protected by the family group. Alcoholics in the early and middle stages of the disease rarely come to the attention of the law enforcement officials. Thus, penal measures reach only the homeless, social misfit group of drinkers and others whose alcoholism is far advanced.

As nearly everybody knows, the attempt to arrest alcoholism by means of punitive measures has been a total failure. The penal approach has been thoroughly discredited as expensive, profitless, and inhumane. Other than the existence of statutes which still make public intoxication a misdemeanor and which should be replaced, there is no justification for sentencing alcoholics to penal institutions for fixed periods of custody and then releasing them. The nature of alcoholism is such that it is impossible to predict with any certainty the length of time required for recovery. If the patient is uncooperative and actually resists treatment, progress in changing his motivation is likely to be slowly achieved. Commitment? Yes—in the advanced cases—but it should be in a specially provided inpatient facility for an indeterminate period of whatever time is necessary to arrest the disease. There should also be provision for conditional release on extended visit status so that the patient may continue under the supervision of the rehabilitation staff while readjusting himself as a member of the community (*8*).

The tremendous monetary cost of the penal approach to alcoholism is reflected in an unpublished report of the director of the department of corrections of the District of Columbia which shows that on June 30, 1953, there were confined in correctional institutions of the District 3,868 prisoners of whom 1,017 were alcoholics. It costs $2.80 a day to maintain an inmate; his maintenance includes food and the personal services of attendants as well as plant maintenance.

At the rate of $2.80 each, the cost of maintaining the 1,017 alcoholics who were in custody of the department of corrections on June 30, 1953, was $2,847.60 for that day. Assuming that June 30 was an average day, the estimated annual cost of maintaining the alcoholic population of the District's correctional institutions is $1,039,374.

Thus, in the District of Columbia more than $1 million of the taxpayers' money is being expended annually on a method of dealing with alcoholism, which reaches, at best and at the most, not more than 20 percent of the alcoholic population and which, as shown by statistics on recidivism which will be quoted later in this

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article, produces no tangible results in the form of rehabilitation.

If this money were devoted to more adequate rehabilitation facilities for alcoholics, we would be in a position to make an effective attack on the disease in all of its phases with prospects of great gains in human happiness and welfare.

Alcoholic rehabilitation programs are financed either by general tax funds or by a levy on liquor revenue, supplemented by fees from patients who are in a position to pay for treatment. The Alcoholic Rehabilitation Act of the District of Columbia (*9*) provides for a 6-percent tax on liquor licenses. This levy yields about $75,000 annually, which is earmarked for the operation of the alcoholic rehabilitation program in the District.

Alcoholic Rehabilitation Program

The alcoholic rehabilitation program of the District of Columbia represents the new, disease-concept approach to the problem of alcoholism. The program has been established as a division within the District of Columbia Department of Health, although as just stated, its funds are separate from the general appropriation for health purposes in the District. The purposes of the District's program are set forth in the act of Congress approved August 4, 1947, as follows (*7*):

"The purpose of this chapter is to . . . provide for the medical, psychiatric, and other scientific treatment of chronic alcoholics; to minimize the deleterious effects of excessive drinking upon those who pass through the courts of the District of Columbia; to reduce the financial burden imposed on the people of the District of Columbia by the abusive use of alcoholic beverages, as is reflected in mounting accident rates, decreased personal efficiency, growing absenteeism, and a general increase in the amount and seriousness of crime in the District of Columbia, and to substitute for jail sentences for drunkenness medical and other scientific methods of treatment which will benefit the individual involved and more fully protect the public. In order to accomplish this purpose and alleviate the problem of chronic alcoholism, the courts of the District of Columbia are hereby authorized to take judicial notice of the fact that a chronic alcoholic is a sick person and in need of proper medical, institutional, advisory and rehabilitative treatment. . . ."

The alcoholic rehabilitation division of the District of Columbia Department of Public Health, an outpatient clinic for the rehabilitation of alcoholics who are residents of the District, was opened on February 1, 1950. The clinic offers a multipronged, multidisciplined approach to the rehabilitation of the alcoholic patient (*2*). Medical, social, psychiatric, and psychological diagnosis and therapy are employed to assist him to recover. The staff consists of 3 psychiatrists, 1 internist, 3 public health nurses, 3 social workers, 2 clinical psychologists, 5 clerks, and 4 recreation leaders, 3 of whom work on a part-time or volunteer basis.

Each new patient at the clinic receives a general physical examination and routine laboratory studies, including chest X-ray and blood test. Any organic difficulties are treated or referred to other community clinics or to private physicians. Diseases incidental to alcohol intoxication receive the special attention of the clinic physician.

One of the psychiatrists on the clinic staff makes a diagnostic appraisal of every patient, after which the patient is assigned to a therapist for a regular weekly interview at which job or family problems of a pressing nature, or significant past experiences, are analyzed for the purpose of discovering the cause of the patient's drinking, averting a recurrence, and facilitating betterment of the patient's way of life. Therapy is determined according to the patient's individual needs and ability to collaborate. Supportive or insight-gaining psychotherapy rather than deep analysis is employed.

Various forms of group therapy supplement individual therapy. Patients have responded to psychodrama with enthusiasm and enjoyment. They easily develop insight into their own and others' behavior during the acting of typical situations and during the discussion afterward.

Diagnostic intelligence and projective and aptitude tests are administered as an aid in treatment.

An appraisal of the patient's initial need is made, and appropriate casework activity is performed. The alcoholic rehabilitation division maintains the closest relations with other agencies which are interested in treating alcoholics, including Alcoholics Anonymous, Harbor Light of the Salvation Army, and various individuals such as clergymen and employers. If it is believed that a patient can benefit by association with another group, his therapist so recommends.

The clinic is located near the center of Washington and consists of a reconditioned school building, which provides ample space for offices and medical facilities, and which contains a lounge and waiting room together with workshops for occupational therapy.

Credits and Debits

During the period February 1, 1950, to August 31, 1954, the outpatient clinic registered 2,577 patients, 1,909 of whom voluntarily sought assistance, and 668 of whom were court referrals. In addition, the clinic has treated many hundreds of persons, usually in an acute stage of alcoholic suffering, who were not registered as patients because they made single visits only and did not return for therapy.

In a followup study of 715 patients who had made 3 or more visits to the clinic as of June 30, 1952, the degree of rehabilitation for each patient was measured in terms of improvement in the drinking pattern, social improvement, and psychiatric improvement. Some patients have been followed since the clinic opened on February 1, 1950; for voluntary patients, the average period of observation in the study referred to was 16.6 months; for court-referred patients, 9.1 months. Favorable results in terms of improvement in the patient's drinking pattern, social improvement and/or psychiatric improvement were achieved in approximately 70 percent of the cases treated within each group of voluntary and court-referred patients (*10*).

Thus, in the majority of cases improvement is sustained; the patient continues his weekly therapy, not only for the purpose of maintaining sobriety, but also, as insight deepens, for the purpose of developing a more effective personality. In many cases, there are lapses from sobriety, but ordinarily the intervals become longer and the severity lessens.

The subject of "lapses" has been much discussed and undoubtedly misunderstood. Perhaps the remark of a patient made at a time when the clinic was under criticism sums it up: "If an alcoholic has been sober one day, he has been helped."

Lapses have been known to occur after 10 years of nondrinking. In the experience of the clinic, a very earnest patient recently lapsed for a short period after 7 years of sobriety. Scientific treatment of alcoholism is relatively new; research projects are constantly under way; and in the end, we hope, discoveries will be made which will alleviate the problem of lapses. In the meantime, there is no more reason for failure to treat alcoholic patients than there would be for failure to aid cancer patients because the ultimate cure has not been found.

What has been said and the examples cited show the severity of alcoholism as a disease. In the medical sense, it is a chronic illness with indefinite prognosis; however, recovery with treatment is achieved in many cases. In the social sense, it tends strongly to detach the patient from society and leads to deterioration of his multiple values, cultural, religious, and so on.

During the 4 years the alcoholic rehabilitation program has been in operation, the outpatient clinic has developed to the point of being well equipped to serve the needs of patients who can be treated on an extramural basis. Patients so treated are usually in the nondestitute class and still have family and community ties which they desire to protect. In most instances, they are voluntary applicants for treatment. Since the early alcoholics of today are the destitute, skid row figures of tomorrow, the clinic by performing valuable preventive work in arresting their alcoholism will in the long run benefit the community as well as the individuals concerned.

On the debit side of the ledger, it must be conceded that the program has made scarcely a dent in the alcoholic problem as it presents itself to the municipal court and law enforce-

ment agencies. In addition, the program has been unable to reach and afford proper treatment to many hidden alcoholics of the type who need inpatient care and who do not pass through the courts. The program's effectiveness is further limited by insufficient funds and lack of proper facilities and by the inadequate commitment procedures prescribed by the existing law.

The Chronic Offenders

The 1947 act (7) directed the commissioners for the District of Columbia to establish and equip a clinic in connection either with some existing hospital or some correctional institution or other facility for the diagnosis, classification, hospitalization, confinement, treatment, and study of persons who are found to be chronic alcoholics. The law authorized the courts, in their discretion, to commit alcoholics who have been arrested on the criminal charge of drunkenness to the clinic for supervision and treatment. Until April 15, 1954, however, it was not possible to commit an alcoholic requiring inpatient care to the clinic because of the lack of proper and adequate treatment facilities.

There is now being tested in the District a new plan which represents the best program of treatment that could be devised within the framework of sections 4 and 8 of the act approved August 4, 1947, and with the financial resources available. On April 15, 1954, the District commissioners, together with officials of the health department, the department of corrections, and the municipal court, inaugurated a program for the commitment of a limited number, not to exceed 25, of alcoholics who have been selected to receive inpatient care at the District of Columbia workhouse at Occoquan, Va.

Four afternoons weekly, psychotherapists, occupational and recreational therapists, social workers, and public health nurses from the clinic collaborate in a "total-push" effort to rehabilitate the patients in the extension clinic of the alcoholic rehabilitation division, which is temporarily set up in the workhouse. Treatment of these committed patients includes individual counseling interviews, physical rehabilitation measures, contact with members of Alcoholics Anonymous, and making arrangements for return of the patients to the community. Such arrangements include the procurement of room and board and vocational assistance. In every instance, plans for continued extramural treatment upon discharge from the workhouse are made. Envisioned is a followup study, for at least 1 year, of every patient committed by the court.

Plans are currently being formulated by the District commissioners to set up a larger rehabilitation center for alcoholics at Muirkirk, Md., which will house 100 patients. When this project at Muirkirk will be realized cannot be gauged at this time. All participating in the pilot project of committing alcoholics agree that the above approach is the most rational and promising method of dealing with the court-offender, homeless type of alcoholic.

With the exception of this newly inaugurated and obviously limited program at the Occoquan workhouse, however, the courts are currently unable to "commit" alcoholics to the alcoholic rehabilitation clinic in the District because of the lack of adequate inpatient facilities, although harassed judges, confronted with offenders who have been arrested 150 times or more for drunkenness, have often threatened to do so. The present practice is to "refer" to the clinic defendants in drunk cases who have been interviewed by a social worker and who are considered good material for rehabilitation under this program. The number who are considered capable of rehabilitation by outpatient care alone is very small—approximately 2 cases a week. These are persons who express a desire for help, recognize that their life situation in relation to drink demands change, and who appear to the social worker hopeful for successful rehabilitation. Of course, these 2 cases a week are but a "drop in the bucket" of the total alcoholic morbidity coming before the courts.

The "Drunk Court"

Most of the alcoholics coming before the municipal court of the District are still dealt with under the code provision which forbids

public intoxication and prescribes penalties of fine or imprisonment. According to an unpublished report of the chief judge of the municipal court to the president of the District Board of Commissioners, 75 percent of all matters coming before the court in the fiscal year 1953—21,988 cases—involved persons arrested for intoxication. As a result of this situation, a section of the court is popularly termed "the drunk court."

Recidivism among persons arrested and sentenced for intoxication has been a matter of concern to the law enforcement agencies of every jurisdiction. Studies have been made in the District of Columbia with the usual melancholy finding that, by and large, arrests for intoxication are accounted for by chronic court repeaters whose more or less constant relationship with the police and correctional departments constitutes a revolving door treatment.

In the report referred to above, the chief judge of the municipal court of the District estimates that repeaters represented more than 90 percent of the 21,988 intoxication cases heard in 1953. Of these cases, 19,268 were disposed of by commitment to the District jail or workhouse for an average sentence of 28 days.

For purposes of this report, records were examined for 139 persons charged with public intoxication who appeared before the criminal division of the District of Columbia municipal court on March 8, 1954. Only 10 of the group had never been arrested before. The remaining 129 were repeaters with records of previous arrests as follows:

Previous arrests for intoxication	*Number of persons*
1–5	47
6–25	42
26–50	22
51–100	16
101–200	1
201–300	1
Total	129

A similar study was made of 529 prisoners in correctional institutions of the District of Columbia who were serving sentences for intoxication. It was found that 45 members of the group had never been committed before, while 484 had served previous sentences as a result of drunk charges. The record of previous commitments for the latter group was as follows:

Previous commitments for intoxication	*Number of persons*
1–4	83
5–9	84
10–14	58
15–19	39
20–29	60
30–39	32
40–49	30
50–74	56
75–99	23
100–124	13
125–149	3
150 or more	3
Total	484

When 5, 6, and 7 commitments a year are not uncommon for repeaters, it is no overstatement to say that under the present system a large number of alcoholics who are sick people according to the language of the 1947 act are spending a major portion of their time in jail and receiving no treatment.

The annual cost of salaries and supplies necessary to the operation of the drunk court in the District of Columbia is approximately $76,200. An associate justice devotes three-quarters of his time to intoxication cases, and 19 other employees devote either full or part time thereto. In view of the doubtful results achieved through the penal approach, it may well be questioned whether this expenditure of time, talent, and money is justified.

As expressed by Chief City Magistrate John M. Murtagh of New York City in a recent speech advocating improved legislation and facilities for the treatment of alcoholism: "We in the criminal judiciary have in the past allowed society to assign to us the responsibility for a tragic human problem which neither we nor anyone else understood. We have blindly acquiesced in a barbaric system that gave us prison bars as the therapeutic approach and denied us even the most modest staff to inquire into the nature of the problem."

Persons arrested on the charge of intoxication do not in every instance pass through the courts. If the offender is able to post $10 collateral and wishes to forfeit the same, he may procure his release without appearing in court. According to the annual report of the chief of police for the fiscal year 1953, 38,333 arrests were made in Washington, D. C., during the

year on the charge of intoxication (*11*). Assuming a maximum of 20 percent who are court offenders among the District's alcoholic population, these 38,333 arrests would be accounted for by 7,380 persons, an average of slightly more than 5 arrests for each.

Toward Sensible Rehabilitation

The hidden alcoholics are another tragedy, less dramatic but equally poignant. These individuals are having serious trouble with alcohol, but they still have homes, families, and, in some instances, jobs. They are unwilling to give up alcohol, which is their major solace in the face of anxiety and depression, although everyone around them can see the handwriting on the wall. Such persons have little contact with the police. Arrest for intoxication, when it occurs, brings an anxious relative or friend to the precinct house to post collateral and procure release. During the fiscal year 1953, collateral amounting to $148,525 was posted and forfeited in the cases of persons arrested for intoxication—another unproductive expenditure insofar as recovery from alcoholism is concerned. There are many hidden alcoholics who need inpatient care for an indeterminate period, as much as persons suffering from other illnesses of an emotional nature, but there is no public institution in the District which is equipped to provide such care in the case of alcoholic patients.

Any attempt to solve the problem of alcoholism must begin with a serious facing up to the deficiencies of the penal approach and a search for more promising methods of treatment. Alcoholism is a problem national in scope. Lives, families, and careers are being destroyed, and many millions of dollars as well are wasted annually, while very little effort is being expended to get at the source of the problem and to alleviate its destructive effects.

Only an increasing awareness on the part of the general public, State and local officials, and our national representatives can set us on the road to meet with impact the vicious challenge which alcoholism presents.

Specifically, in terms of additional inpatient facilities, the alcoholic rehabilitation program in the District of Columbia, and in countless other major cities in the United States as well, needs the following:

A hostel or halfway house, a boarding home where alcoholics in the convalescent stage could be admitted and allowed to stay in a controlled environment until well on the way to rehabilitation—a moderate amount would be paid for board and room by those capable of obtaining employment.

A hospital ward for the screening (diagnosis and classification) of alleged alcoholics and for the short-term care of alcoholics in the acute stage of intoxication—arrangements have been completed for a small alcoholic ward in the municipal hospital of the District (the District of Columbia General Hospital), which could be enlarged to serve this purpose.

An institution for long-term treatment of alcoholics and for the custodial care of deteriorated, incurable patients—this should be a hospital, located in a rural area, with sufficient acreage for farming and workshops for occupational therapy and vocational training.

Suggested Commitment Procedures

In those localities which are ready for a changeover from criminal to civil methods of dealing with alcoholism, essentially a problem of public education and of correcting or modifying local legislation, it is suggested that careful consideration be given to the creation of a commission on alcoholism, similar to the local commissions on mental health, which have been established in some jurisdictions including the District of Columbia (*12*). Such commission would be responsible for holding fact-finding hearings in the cases of alleged chronic alcoholics and making recommendations to the court for commitment, treatment on an outpatient basis, and discharge for the alcoholic who has not progressed to the chronic stage, or some other appropriate disposition. Such commission would be an arm of the courts and would act in aid thereof. As in mental health cases, orders for commitment of chronic alcoholics would be issued by the court on the basis of the findings and recommendation of the commission on alcoholism.

Although not essential, the chairman of any such commission might well be a lawyer, experienced in the field of psychiatry, whose duty would be to direct the proceedings and hearings in such manner as to assure fairness. The commission's other members should be psychiatrists and psychiatric social workers with specialized experience in the field of alcoholism.

A judicial trial in the ordinary sense is not appropriate in determining whether a person is a chronic alcoholic in need of institutional care and is not required by due process of law (*13*). A commission composed of persons with specialized knowledge of alcoholism could be expected to possess an expertise which would make for just and wise findings and recommendations. As Henry Weihofen has so succinctly stated in discussing commitment procedures without judicial trial—he is referring specifically to mental illness (*14*):

"The only argument made in favor of full hearing in these cases is that sane persons might otherwise find themselves committed. But since no one would suggest that more than a small percentage of commitment cases involve anything improper, it seems a blunderbuss method to require elaborate formalities in all cases, in order to avoid abuse in a few. Easy and informal admission is the most humane to the patient and least expensive for the taxpayer. The relatively rare cases where the patient wants to contest the commitment order could be handled by allowing a full hearing on appeal."

It would, of course, be necessary that the legislative act setting up a commission on alcoholism guarantee to all affected thereby the essentials of due process of law—adequate notice of the hearing to be held by the commission, the opportunity to present a defense, and the right to counsel. In addition, as Weihofen suggests, there should be a right of appeal to the court for a trial de novo, if the patient so requests.

Any new or revised laws dealing with the commitment of alcoholics should contain a provision similar to that contained in the District of Columbia legislation on mental health (*12*), whereby a petition may be filed by a relative, friend, physician, police, or welfare officer, requesting that a hearing be held and the individual committed to an institution for alcoholism if it is found that he requires inpatient care.

Periodic examinations should be required after admission to the hospital, whether as a result of commitment or as a voluntary act, in order to determine the need for continued hospitalization. Outright discharge, or transfer to the suggested convalescent home, should be authorized as soon as the patient's condition warrants. In other words, the requirement of medical certification as to the need for detention and hospitalization should be regarded as a continuing one, which is subject to change as progress is made toward rehabilitation.

Since institutions for the care of the mentally and emotionally ill are generally overcrowded, the fear of "railroading," or illegal detention, is probably greatly exaggerated. However, under our system of jurisprudence, the writ of habeas corpus is available, in addition, to anyone who claims that he is being deprived of his liberty illegally.

Ideally, the term of commitment should be indeterminate, as is usual in mental health cases. Those who advocate a relatively short maximum commitment, such as 90 days, fail to recognize the complexity of alcoholism as a disease. It is true that 90 days would be sufficient in many cases, but where the disease is far advanced, where the patient has lost home, family, and job ties, where self-respect is low and life values have deteriorated, longer treatment will be required in order to effect rehabilitation.

There are obvious advantages in providing in the legislation for voluntary admission to inpatient facilities. A person believing himself to be a chronic alcoholic when admitted upon his own application could not be restrained from leaving if he chose to do so. However, he should be required to give a few days' notice of his intention to leave in order to prevent a too hasty decision.

Conclusion

As phrased by Judge Murtagh in the speech referred to, alcoholism is a "tragic human problem," psychiatric in its nature, with medical and social aspects, to which penal procedures have been drearily and futilely applied. Clinics throughout the country, such as the one maintained by the alcoholic rehabilitation division of the District of Columbia Department of Public

Health, are doing what they can, but additional facilities, particularly for inpatient treatment, are desperately needed, and could be provided if the money which is now being used for the processing of intoxication cases as criminal were diverted to more enlightened purposes. The time will come when there is understanding of the problem, with public demand for change.

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Epidemiology Course for Nurses

The Communicable Disease Center, Public Health Service, is offering a refresher course in communicable disease control to public health nurses and instructors in communicable disease nursing, May 16 through June 3, 1955, in Atlanta, Ga.

The course is designed to increase the technical knowledge and skills of nurses in the prevention and control of communicable diseases. Epidemiological principles and techniques will be emphasized.

Field experience under supervision will be available to a limited number of students following the completion of the course.

For further information and application, write to your State health department director of public health nursing or to the Chief, Communicable Disease Center, Attention: Chief Nursing Consultant, 50 Seventh Street, N. E., Atlanta, Ga.

Venereal Disease Contacts Of Merchant Seamen

By JOHANNES STUART, Ph.D.
and GEORGE JOYCE

THE Division of Foreign Quarantine, in cooperation with the then Division of Venereal Disease, Public Health Service, conducted a study of venereal disease contacts among merchant seamen during a 6-month period beginning June 1, 1951, and ending November 30, 1951. The purpose of the study was to determine which seaports of the world are the principal foci of infection.

Each major quarantine station in the United States, Hawaii, and Puerto Rico participated. A contact study report was completed for each seaman (citizen or alien) who had been treated for venereal disease during the voyage to the United States or who had clinical symptoms of venereal disease and was so diagnosed upon arrival. The report form included the name and nationality of vessel, date of arrival, nationality of the seaman, venereal disease for which the seaman was treated, number of previous infections, ports where sex contacts occurred, number of days of shore leave, and number and type of different sex partners.

In the 6-month period of the study, 2,426 infected seamen reported 4,364 sex contacts in ports throughout the world. This represents a contact index of 1.80. Of the total number of infected seamen, 2,052 (84.6 percent) were treated for venereal disease en route to the United States, and 381 (15.7 percent) were treated upon arrival. (The total exceeds 100 percent because some men were treated both en route and upon arrival.) Patients with gonorrhea accounted for 1,953 of the venereal infections and comprised 80.5 percent of the total 2,426. Based on current venereal disease rates, the 1,953 cases of gonorrhea represent the morbidity which might be expected from a population of 1,286,000 United States citizens annually. Similarly, the 225 cases of syphilis are equal to the annual morbidity of infectious cases to be expected among 1,086,000 United States citizens.

Although some 30 countries of residence were represented, 64 percent of the infected seamen were Americans. Fifty-one percent of the patients reported they had had previous infections. The number of infected seamen reported to quarantine stations in the various geographic areas are as follows: east coast, 982; gulf coast, 298; west coast, 1,057; Hawaii, 60; and Puerto Rico, 29. The nationalities of infected seamen, arranged in descending order of frequency, were: American, Norwegian, British, Danish, Swedish, Canadian, Dutch, Greek, German, Honduran, Finnish, French, Cuban, and Spanish. Each of these nationalities included 10 or more infected seamen.

Table 1 lists the leading ports of exposure throughout the world and shows the number of seamen infected and the number of exposures. The total number of infected seamen and contacts also are shown for each port and continent. Since some men were exposed in more than one port, the sum of infected men in this table exceeds the total of 2,426.

Table 2 indicates the number of contacts by geographic area of exposure and type of contact. "Pickup-no-fee" is reported more often than any other type of contact in ports of the United States and Europe. On the other hand, "house prostitute" is reported more often than other types of contacts in Mexico, Japan, West Indies, Central America, South America, India, and Africa. Of the total contacts in all ports, almost half (47.2 percent) were reported as "house prostitute." The remaining types of contacts were distributed among "streetwalker"

Dr. Stuart is health program officer and Mr. Joyce is a statistician with the Venereal Disease Branch, Division of Special Health Services, Public Health Service.

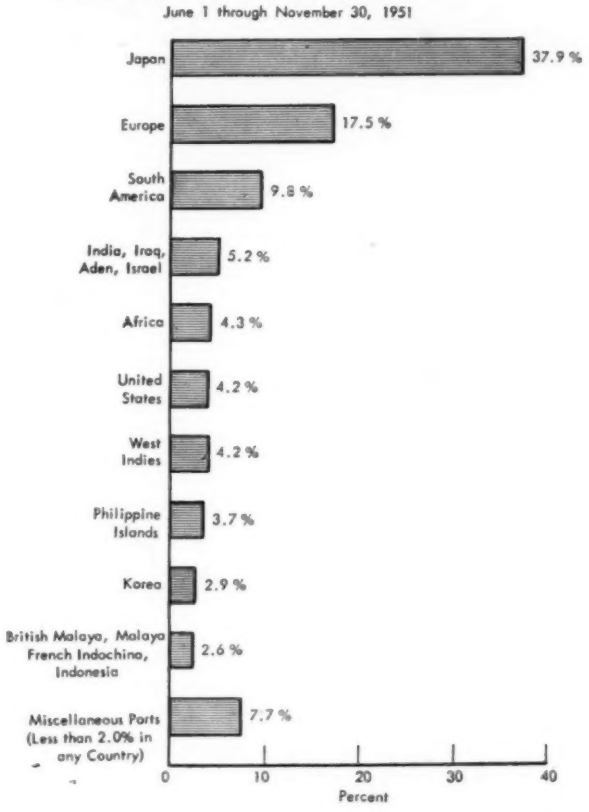
Table 1. Number of infected merchant seamen and sex contacts, by leading ports of exposure and continent, June 1–November 30, 1951

Port of exposure, by continent	Number infected seamen	Number sex contacts
North America:		
New York City	21	32
Baltimore	12	31
Houston	11	14
San Francisco	9	15
All other ports of the United States	67	92
All ports of Canada	22	27
Tampico, Mexico	9	11
Veracruz, Mexico	6	7
Alvaro Obregon, Mexico	4	4
All other ports of Mexico	4	5
Havana, Cuba	31	45
Santiago, Cuba	11	20
Trinidad, British West Indies	16	19
San Juan, P. R	9	11
All other ports of West Indies	70	87
Puerto Cortes, Honduras	7	7
Puntarenas, Costa Rica	7	8
Cristobal, C. Z	6	7
All other ports of Central America	44	60
Total	366	502
South America:		
Vitória, Brazil	54	102
Santos, Brazil	44	73
Rio de Janeiro, Brazil	30	57
All other ports of South America	156	194
Total	284	426
Europe:		
Bremerhaven, Germany	52	59
Rotterdam, Netherlands	47	70
Hamburg, Germany	40	60
Rouen, France	39	64
All other ports of Europe	347	510
Total	525	763
Africa:		
Casablanca, Morocco (French)	20	45
Durban, Union of South Africa	16	26
Capetown, Union of South Africa	13	17
All other ports of Africa	57	100
Total	106	188
Asia:		
Bombay, India	38	74
Calcutta, India	47	85
Vizagapatam, India	24	26
All other ports of India	20	29
Yokohama, Japan	355	700
Kobe, Japan	198	292
Moji, Japan	85	125
Sasebo, Japan	68	95
All other ports of Japan	256	442
Pusan, Korea	79	116
Manila, Philippine Islands	72	84
Hong Kong, China	40	47
Jogjakarta, Indonesia	37	40
All other ports of Asia	232	330
Total	1,551	2,485
Grand total	2,832	4,364

Table 2. Venereal disease contacts of merchant seamen, by geographic area of exposure and type of contact, June 1–November 30, 1951

Geographic area	Number of contacts	Percentage distribution of contacts				
		House prostitute	Street-walker	Pickup-no-fee	Friend	Unknown
United States	184	17.4	14.7	52.2	15.7	0
Mexico	27	70.4	14.8	14.8	0	0
West Indies	182	50.0	21.4	24.7	3.9	0
Central America	82	57.3	20.7	15.9	6.1	0
South America	426	55.4	17.8	24.9	1.4	.5
Europe	763	16.0	33.6	45.1	4.8	.5
Africa	188	71.3	6.4	19.7	2.6	0
India	214	82.2	4.7	8.0	2.3	2.8
Japan	1,654	52.4	32.9	10.0	3.8	.9
Miscellaneous ports of Pacific	601	54.1	31.6	11.6	2.5	.2
Other miscellaneous ports	43	25.6	18.6	44.2	11.6	0
Total	4,364	47.2	27.1	21.0	4.0	.7

Percentage distribution of 4,364 contacts of merchant seamen infected with venereal disease, by geographic area of exposure.



(27.1 percent), "pickup-no-fee" (21.0 percent), and "friend" (4.0 percent).

The chart shows graphically the percentage distribution of contacts by area of exposure. Japan represents the greatest venereal disease problem with 1,654 contacts (37.9 percent of the total 4,364 sex contacts). Europe ranked second with 763 contacts (17.5 percent of the total).

A question which arose but is not answered by the analysis of the preceding data was how much of a hazard is presented by merchant seamen as agents in the transmission of venereal disease across international boundaries. Since all the seamen in the group above were treated before or upon arrival in the United States, no opportunity was permitted them on their return to transmit infections acquired abroad to residents of the United States.

To assay the extent of such transmission, another group of patients was interviewed for contacts: 119 merchant seamen with infectious syphilis admitted to the Staten Island Public Health Service hospital in 1952–53. Of those interviewed, 34 (29 percent) reported contacts both in the United States and in foreign countries. It would thus seem that a considerable proportion of infected merchant seamen were acting as agents in the international exchange of venereal disease.

However, when these 34 individuals naming both foreign and United States contacts were classified by nationality, it was found that only 3 of them were foreign seamen. The remainder were Americans. It would appear, therefore, that the American seamen may be the principal agent among seafaring personnel in carrying venereal disease between foreign countries and the United States. This may be associated to some extent with the greater accessibility to sex partners by American merchant seamen because of their higher pay scales. It probably is more closely related to the fact that American seamen are not screened for disease at American ports of entry in the same way as are foreign seamen.

Results of the Cancer Teaching Program In Medical Schools

By RAYMOND F. KAISER, M.D.

THE Public Health Service program of grants to medical schools to coordinate the teaching of cancer has completed its seventh year. The program, administered by the National Cancer Institute, has been expanded since its beginning in June 1947 until 82 of the Nation's medical schools are currently participating.

The basis of the institute's cancer teaching program was a conference report entitled "Cancer in the Medical School Curriculum," published in August 1947 by the National Advisory Cancer Council, which recommended financial assistance to medical schools prepared to undertake an integrated cancer teaching program. It summarized the findings of a conference at the National Cancer Institute in 1946, attended by deans and professors from a number of medical schools and representatives of the National Research Council, the American Cancer Society, the National Advisory Cancer Council, and other units of the Public Health Service.

Cancer in the Medical School Curriculum helped formulate the objectives of the program essentially as follows:

Development of an awareness of cancer among medical students.

Dr. Kaiser is chief of the Field Investigations and Demonstrations Branch of the National Cancer Institute, National Institutes of Health, Public Health Service.

Effective utilization of current knowledge to supplement gaps in the students' information on cancer.

Reduced emphasis in class instruction on the incurability of cancer.

Coordination of cancer teaching in any manner which would provide the student, at some time during the course of his studies, with a comprehensive concept of the disease in all its aspects.

Emphasis on the need for group presentation and consultation in the discovery, diagnosis, and treatment of cancer.

Stimulation of student interest in cancer research.

Increased participation of the internist in cancer teaching.

Improvement of medical service to cancer patients.

It was obvious from the beginning of the program that effective methods of coordinating the teaching of cancer would vary from school to school. The National Cancer Institute had no desire to suggest a uniform instruction plan to all participating institutions. It was decided, then, that each school should have an opportunity to develop the type of teaching program best adapted to its particular method and philosophy of medical training and most suited to its personnel and available facilities. A policy of permitting complete academic freedom in curriculum matters was adopted at the beginning and has never been changed. Moreover, allocation of grant funds was left, as far

as possible, to the discretion of participating schools with the reservation that these funds should not be used to replace existing budgetary commitments or to underwrite specific research projects.

Since the program is by nature long-range, it was clear when the project was introduced that continuity was essential, and the institute has provided all possible assurance of continuity. All approved medical schools are considered eligible for grant funds. In 1947, the National Advisory Cancer Council recommended a maximum of $25,000 annually for each 4-year medical school and $5,000 annually for each 2-year school. These amounts have remained the same throughout the program.

The extent of participation for the 82 medical schools in the country receiving funds under this grant program follows.

Schools	*Year of participation*
46	7th
26	6th
4	5th
2	4th
1	3d
3	1st

When the program began, one of the council's recommendations was that the dean and faculty of each medical school review the cancer teaching methods then practiced in their own institutions. These reviews indicated that with very few exceptions the following conditions prevailed:

There was duplication in teaching some facets of the subject.

Some aspects of cancer were incompletely covered in the course of instruction and others were entirely omitted.

In some instances, conflicting information was presented on the same phase of the subject by different departments.

Only ordinary emphasis was given to cancer in the routine instruction.

There was little systematized cancer instruction.

Cancer teaching consisted almost entirely of individual departmental courses of instruction. Definite correlation in an overall curriculum was lacking.

Minimal opportunity was provided for the student to learn the natural history or course of the disease.

Most of the teaching was didactic in nature with minimal opportunities for clinical instruction.

An inadequate number of instructors and faculty members were actively interested in cancer teaching.

No organized body or specific individual was available to integrate cancer teaching.

Coordinator of Cancer Teaching

A project which might be described as an experimental program in cancer education was established in the medical schools as a result of these survey findings. It was recognized that considerable integration would be necessary to realize the purposes of the program. The establishment of a position variously titled but essentially that of "coordinator of cancer teaching" was found to be the best method of accomplishing the desired integration. Each participating school designated a staff member to serve as coordinator. In some schools this individual was already a member of the faculty. In many instances, however, it was necessary to recruit qualified persons from outside the institutions. At present 39 surgeons, 22 pathologists, 10 radiologists, 6 internists, 1 gynecologist, 1 dermatologist, 1 urologist, 1 bacteriologist, and 1 dean are serving as cancer coordinators.

It is interesting to note that 53 of the individuals initially designated as cancer coordinators have served in this capacity throughout the duration of the grant program. In the remaining schools, there have been one or more changes in this position. One reason for changes has been increased capability on the part of coordinators. In one school which has had three changes, one former coordinator became director of a large State cancer hospital; another was named chief of surgery at a recently established city cancer hospital, and a third has gone to another university to become associate professor of surgery and director of the tumor clinic. While there has been a good deal of turnover in some of the coordinator positions, it is believed that this is an

index of the worthwhile nature of the grants, in that they afford the schools an opportunity to recruit qualified men to their faculties.

Establishment of cancer coordinator positions has been one of the most potent program factors in improving the quality of cancer teaching. In fact, the alternative of a new and separate department of cancer teaching has led various departments in some schools to make a determined effort to improve the quality of their instruction in order to keep the subject in their curriculums. Three schools have established separate departments of oncology, and three others have formed divisions of oncology. The remaining schools have established a variety of administrative arrangements to stimulate the integration of cancer teaching.

The mere existence of a coordinator and the availability of grant funds have served as a stimulus to focus the attention of the medical school faculty on the cancer problem. This, in turn, has led to the establishment in the schools of cancer committees whose membership includes heads of major services and departments and such other officials as individual schools find appropriate. Initially, these committees tended to be composed of representatives of the clinical departments. However, as time went on, representatives of the preclinical departments were included. As the usefulness of the committees became apparent, more schools adopted the idea, and cancer committees are currently found in all schools participating in the program. These committees, operating through interdepartmental cooperation, have been one of the most effective means of bringing about the integration of cancer teaching.

Changes in Teaching Methods

The focusing of attention on the cancer problem led to a number of experiments, some successful and others unsuccessful, in the schools' approach to teaching the subject. The institutions present many variations in their programs to improve undergraduate medical education in cancer. However, a number of changes in cancer teaching which have resulted from the grant program are common to many of the participating schools.

Practically all the institutions have come to consider a teaching tumor clinic essential to cancer instruction. At the beginning of the program, 43 of the schools had tumor clinics. But in most instances the clinics were operated as staff or service functions with a limited number of patients, inadequate followup procedures, and little or no student participation. Under the grant program, these schools have expanded and improved their general tumor clinics and some special departmental tumor clinics as well. Since its inception, the grant program has also been instrumental in motivating the establishment of tumor clinics in 30 additional schools. All these clinics are currently operating as teaching clinics with active student participation required. A tremendous increase in the students' contact with clinical material and improved services to cancer patients have resulted from these practices.

Hand-in-hand with increased clinical facilities has gone an increase in the number of teaching tumor conferences or tumor board presentations. This method of teaching has been initiated in 43 of the schools since the program began. Existing tumor conferences in 20 schools have been strengthened and expanded during the same period. All the tumor conferences are operated as teaching sessions with active student participation.

Additional Hours and Courses

Although it would be misleading to attempt to evaluate the effect of the teaching grants in terms of additional hours in the curriculum devoted to cancer instruction, it is noteworthy that all participating schools have in fact increased their cancer teaching hours. In general, this has been accomplished through a rearrangement of hours of instruction, revision in content of the material taught, elimination of needless repetition, the addition of material previously omitted, and increased emphasis on cancer in existing departmental instruction. Increased emphasis on cancer instruction in pathology was reported by 68 schools, in radiology by 43, in surgery by 41, in gynecology by 28, in medicine by 24, in biochemistry by 18, in anatomy by 12, in dermatology by 8, in physiology by 7, and in ophthalmology and otolaryngology by 5.

The fact that 52 schools have added one or

more new cancer courses to the curriculum is of special interest. Some of the courses were initially elective; but as the program progressed, they were incorporated into the regular curriculum and have been established as required courses. Some are in the nature of orientation courses which attempt to correlate the basic sciences and clinical medicine. Specific endeavors in this area through the initiation of correlation clinics or correlation courses have been reported by 27 schools. Other new courses are concerned with physical diagnosis and special cancer diagnostic procedures. Still others deal with the biology of cancer, carcinogenesis, cancer etiology and epidemiology, cancer research, and experimental cancer.

Twenty-two schools have found it desirable to extend their cancer teaching in the field of cytology. Cytology laboratories have been established under these grants in 10 of the 22 schools. Isotope laboratories were established by 6 schools, which, also, together with 9 other schools, extended their cancer teaching into the field of radioisotopes.

During the program there has been a definite increase in the use of the team-teaching technique. To implement this type of teaching, 27 schools have initiated cancer symposiums or cancer seminars in which the students actively participate.

Small group ward teaching has been introduced into 22 schools since the beginning of the program. All the schools have shown a strong trend to introduce the student to cancer patients earlier in his career, to increase his contacts with cancer patients, especially his diagnostic encounters, and generally to widen his clinical experience. The schools have shown a corresponding decrease in didactic lectures.

Increased Staff and Equipment

A large personnel force is necessary for the increased cancer teaching indicated above, and 65 of the schools report that the grants have permitted them to increase their professional staffs. In this group there are 23 schools in which the cancer coordinator represents at least a part of the increased personnel. Reports from 45 schools indicate that they have been able to add to their staffs such ancillary employees as medical artists, technicians, photographers, social workers, clinic secretaries, clerks, statisticians, record librarians, clinic nurses, and physicists.

The grants have enabled all the schools to increase markedly their visual educational materials, including kodachromes, lantern slides (clinical and pathological), models, moulages, museums, filmstrips and films, and such equipment as cameras and projectors. In order to prepare their own materials, 11 schools established photographic departments. A number of cancer films have been produced by three of the schools.

Under this program, the majority of the schools have strengthened their pathology service through the preparation and collection of lantern slides (clinical and pathological) or by the addition of equipment like projectors, technicians' microscopes and scopicons. Tumor registers have been established by 18 schools and cancer registers, together with followup programs, by 33 others. Such services have enabled 17 schools to include social and psychological problems of cancer patients in their teaching. Moreover, these services have brought about an improvement in the medical records of at least half the schools. Reports from 55 of the schools say that the program has stimulated cancer research in their institutions and that this research has resulted in increased interest in the cancer field among students and faculty members. In this connection, 20 schools provide student fellowships under the grants, largely for student assistance on research projects.

Use of Grant Funds

Although the original intention was to restrict grant support to undergraduate teaching, it has become apparent that the program cannot be dissociated from other interested groups. The fact that 26 schools have established visiting lectureship programs which are open to medical students, interns, residents, house officers, and practicing physicians is evidence that cancer teaching has spread into the postgraduate area.

The effectiveness of the cancer teaching program cannot be reduced, of course, to a numeri-

cal evaluation. However, the above enumeration does provide some indication of the results of the grants. Another perspective may be provided by a brief analysis of the utilization of grant funds over the years. In the first years of the program, the funds were distributed as follows: Approximately 64 percent was allocated for personnel, 23 percent for permanent equipment, 6 percent for consumable supplies, 2 percent for travel, 2 percent for other expenses, and 3 percent for overhead. A considerable portion of the first grants was necessarily used for permanent equipment. Since then there has been a progressive increase in the portion used for personnel and a proportionate decrease in the amount used for equipment. The percentage allotted to overhead has been slightly more than doubled, but it has never reached the 8 percent allowable for this item. The amount used for travel has increased 1 to 2 percent while the portion for consumable supplies and other expense has decreased 1 to 2 percent. Approximately 85 to 90 percent of the total funds are currently used for personnel, with the remaining 10 to 15 percent distributed among the other five categories.

Accomplishments

Despite the difficulties of providing specific and indisputable evidence of the results of these grants, it is possible to point to a number of general accomplishments under the program:

It has greatly increased, in all probability, the awareness of cancer not only among medical students but also in medical school faculties.

It has stimulated the schools to make remarkable changes in cancer teaching practices.

It has promoted the use of several types of visual aids which help materially in the communication of factual information to students.

In addition to visual aid material, it has provided other improved teaching equipment and tools.

It has increased clinical instruction in cancer.

It has increased the emphasis on group presentation and consultation in the discovery, diagnosis, and treatment of cancer.

It has increased the use of current knowledge about the disease through additional and supplementary courses of instruction.

It has improved medical service to cancer patients through the establishment of new and additional cancer clinics and by the provision of funds for needed clinic equipment.

It has stimulated student interest in cancer research and assisted in the development of cancer research programs in many schools.

It has resulted in a greater interest in cancer teaching.

It has enabled institutions to obtain and retain qualified teachers who might not otherwise have joined medical school faculties.

It has provided funds for the establishment of cytology and isotope laboratories.

It has provided funds for the establishment of photographic and medical illustration departments.

It has assisted in the establishment of more adequate record systems and in the development of followup programs.

It has made evident the need for cancer instruction in postgraduate fields and has furthered such teaching.

It has brought about coordination of cancer teaching, largely through increased interdepartmental cooperation, in both the preclinical and clinical years, and has materially improved the teaching.

It has focused attention not only on cancer but also on the ascending prominence of other diseases related to later life. It has achieved curriculum changes and changes in the concepts of medical education in keeping with the shifting demands indicated by this situation.

Lastly, it has caused a beneficial chain reaction in that improved cancer teaching has led to better teaching in general in the medical schools. In the final analysis the beneficial effects of this program cannot be based on the formulation of instruction techniques and their organization within the medical school curriculum. The program must be measured by the long-range effect the teaching will have on the reduction of cancer mortality.

These observations regarding the survival of E. coli and S. schottmuelleri in soft clams and shell oysters which were artificially polluted and stored under natural conditions will be helpful in the rational control of one of the more turbulent fields of sanitation.

Survival of Enteric Organisms In Shellfish

By C. B. KELLY and WILLIAM ARCISZ

SANITARY control of the shellfish industry has relied largely on assurance that shellfish are harvested from waters beyond the influence of dangerous pollution. Among the stipulations for an approved shellfish area, the Public Health Service Manual of Recommended Practice for the Sanitary Control of the Shellfish Industry (*1*) includes a limiting coliform most probable number (MPN) of the overlying water.

Recognizing the desirability of bacteriological criteria for shellfish as well as for waters from the growing areas, the Public Health Service has included in the manual certain tentative coliform MPN values for oysters and other shellfish as taken from the growing area. Interpretation of bacterial findings in shellfish at the market, particularly in species of shellfish other than oysters, is quite difficult in the absence of specific data on the reliability of the indicator organisms as representative of the presence or absence of enteric pathogens. A criterion of the value of any indicator organism is obviously the relative survival as compared to the pathogens, not only in water, but also in the shellfish after the shellfish have been removed from the water.

There is no question concerning the persistence of enteric pathogens in shellfish after they have been harvested. Epidemiological data, such as that summarized by Fisher (*2*) and more recent reports (*3–5*), contain incontrovertible evidence of the transmission of enteric diseases by shellfish. Furthermore, there is sufficient experimental evidence, at least with *Salmonella typhosa*, to show that this organism will survive for a long period of time in both shell and shucked oysters. This is borne out by Hunter's (*6*) conclusions, based on a review he made of the literature as of 1928, that *S. typhosa* will remain viable within the bodies or shell liquor of oysters long enough to cause illness when oysters are eaten within the usual period elaps-

Mr. Kelly and Mr. Arcisz are, respectively, the chief and bacteriologist of the Shellfish Sanitation Laboratory of the Public Health Service's Robert A. Taft Sanitary Engineering Center. Since this report was written, the laboratory has been moved to Pensacola, Fla., from Woods Hole, Mass. *An earlier report on the Bacteriological Control of Oysters During Processing and Marketing by the same authors appeared in the August 1954 issue of Public Health Reports, pp. 716–720.*

ing between the time they are removed from the infected water and the time they are consumed.

Experimental data on species of shellfish other than oysters, however, are quite limited. Except for a few experiments conducted by Klein (*7*) with mussels and cockles, no studies have been made with other commercially important species of shellfish.

Therefore, during 1952 and 1953, in Woods Hole, Mass., at the Shellfish Sanitation Laboratory of the Public Health Service, we conducted a number of experiments to determine the relative survival of *Escherichia coli* and *Salmonella schottmuelleri* in oysters and soft clams—two of the more commercially important shellfish in the North Atlantic coast area. This investigation was considered desirable, in view of the limited data on survival of either coliforms or enteric pathogens in these species of shellfish: *Crassostrea virginica*, the eastern oyster of the Atlantic and Gulf coasts, and *Mya arenaria*, the soft clam of the New England and Middle Atlantic coast. Furthermore, improvements in bacteriological techniques and development of methods since the earlier studies have made possible more quantitative estimations of enteric pathogens.

The Plan of Study

The basic principles in this reinvestigation of survival of enteric organisms in shellfish were considered to be as follows:

1. Experimental animals should be allowed to become polluted by natural physiological processes—by exposure to sea water containing predetermined suspensions of the polluting organisms.

2. Polluting organisms should be present in the experimental animals in concentrations within the range found under naturally occurring circumstances. The sensitivity of the available methods for enumerating the test organisms would be a limiting factor in establishing the level of concentration, particularly of enteric pathogens.

3. In order to make a direct comparison of the survival of the selected indicator organism, *E. coli*, with the selected pathogen, *S. schottmuelleri*, mixtures of the two organisms, in appropriate ratio, should be used as the polluting agents.

4. Storage of the polluted shellfish should be conducted at controlled temperatures.

5. Survival of test organisms should be determined by quantitative methods of enumeration.

6. Storage should be conducted for a length of time equivalent to the longest period the shellfish might be expected to be in transit from harvesting to consumption, except that the experiment should terminate when inspection and other tests indicate that the shellfish have deteriorated to the extent that they are unsuitable for human consumption.

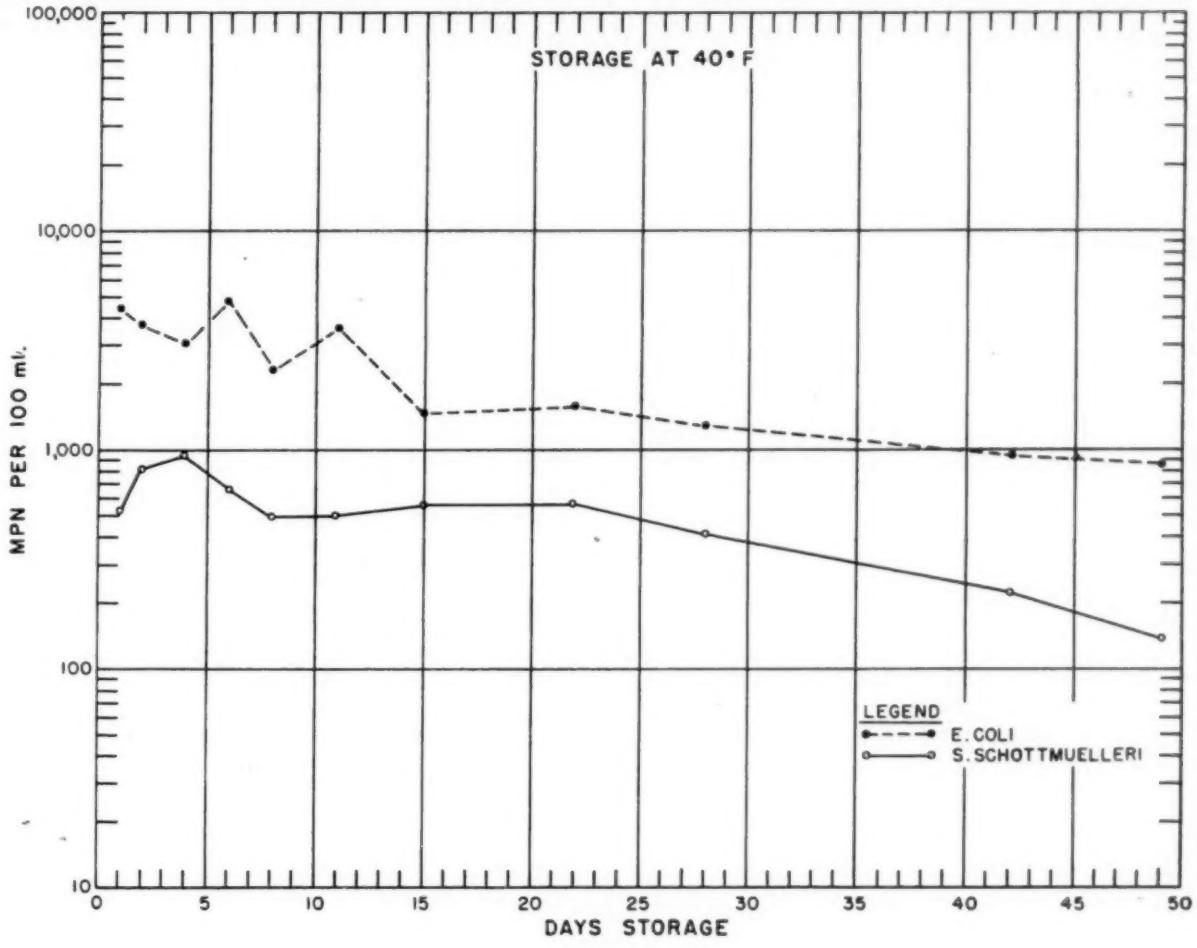
Pollution

Pollution of the shellfish was accomplished by immersing the shellfish in a wooden aquarium containing sea water to which had been added a sufficient quantity of suspensions of *E. coli* and *S. schottmuelleri* to produce a bacterial density in the water of approximately 10,000 and 1,000 per 100 milliliters, respectively. The shellfish were allowed to remain in this water for a period of 6½ to 8 hours in order to effect the accumulation of the maximum

Table 1. Survival of Escherichia coli and Salmonella schottmuelleri in shell oysters

Days of storage	*E. coli* (MPN per 100 ml.)		*S. schottmuelleri* (MPN per 100 ml.)	
	Experiment 1	Experiment 2	Experiment 1	Experiment 2
1	6,000	4,400	160	520
2	3,500	3,800	130	820
3	1,500		160	
4	1,400	3,100	270	960
5	1,400		220	
6	2,400	4,900	190	660
7	1,300		170	
8		2,300		500
10	1,300		240	
11		3,600		500
12	600		210	
14			210	
15		1,500		570
16	600		130	
20	200		140	
22		1,600		570
28		1,300		420
42		960		230
49		890		140

Figure 1. Survival of Escherichia coli and Salmonella schottmuelleri in shell oysters.



amounts of the polluting bacteria. At the end of that time, the shellfish were transferred to watertight metal containers for storage.

Storage

Refrigerated storage of the shellfish was conducted in a household type refrigerator, which had been adjusted to maintain a temperature of approximately 40° F. (5° C.). The temperature of the refrigerator during the storage period ranged between 33.6° F. and 48° F. (1°–9° C.).

The soft clams were also stored at a warmer temperature, in an attempt to simulate conditions normally present in commercial handling. Storage at a temperature of 66° F. (19° C.) was considered to be most representative of conditions prevailing in the marketing areas where clams are handled. Storage at this temperature was conducted in a bacteriological incubator adjusted to maintain the desired temperature.

Bacteriological Methods

Quantitative estimation of bacterial densities was conducted by the dilution method in which at least 4 decimal dilutions—5 tubes for each dilution—were used.

The method for enumerating *S. schottmuelleri* involved enrichment in tetrathionate broth or selenite F broth, with isolation of typical colonies from brilliant green agar or bismuth sulfite agar. The test was completed by confirmation on Russell's double sugar agar, with occasional confirmation serologically using salmonella group B antiserum.

The test for enumerating *E. coli* consisted of preliminary plantings of decimal dilutions in lactose broth, with confirmation in brilliant green lactose bile broth.

Results of tests for both organisms were expressed as most probable numbers per 100 milliliters according to Hoskins tables (*8*).

Results

The results obtained in two experiments on storage of shell oysters are shown in table 1. In order to absorb variations in results inherent in the MPN method of enumeration, the data are presented as 3-day logarithmic moving averages of the observed values.

In experiment 1, where the shell oysters were stored for a period of 22 days, it was found that the numbers of *E. coli* reduced throughout the entire period of storage, but little, if any, reduction in *S. schottmuelleri* was observed.

In experiment 2, which is illustrated in figure 1, storage was continued for a longer period—49 days. The reduction in the numbers of the two test organisms was more nearly parallel, particularly after the fifth day of storage. Both *Salmonella* organisms and *E. coli* were recovered in significant numbers at the end of the period of storage.

We observed little, if any, deterioration of the oysters. Some dehydration of the meats did occur, owing to storage under dry conditions, but the oysters were still in salable condition at the end of the storage periods of 22 and 54 days.

Two series of experiments, two experiments each, were conducted on soft clams; one series was conducted during cold weather, in January and February, and the other in April and May during more moderate weather. The results of these experiments are shown in table 2.

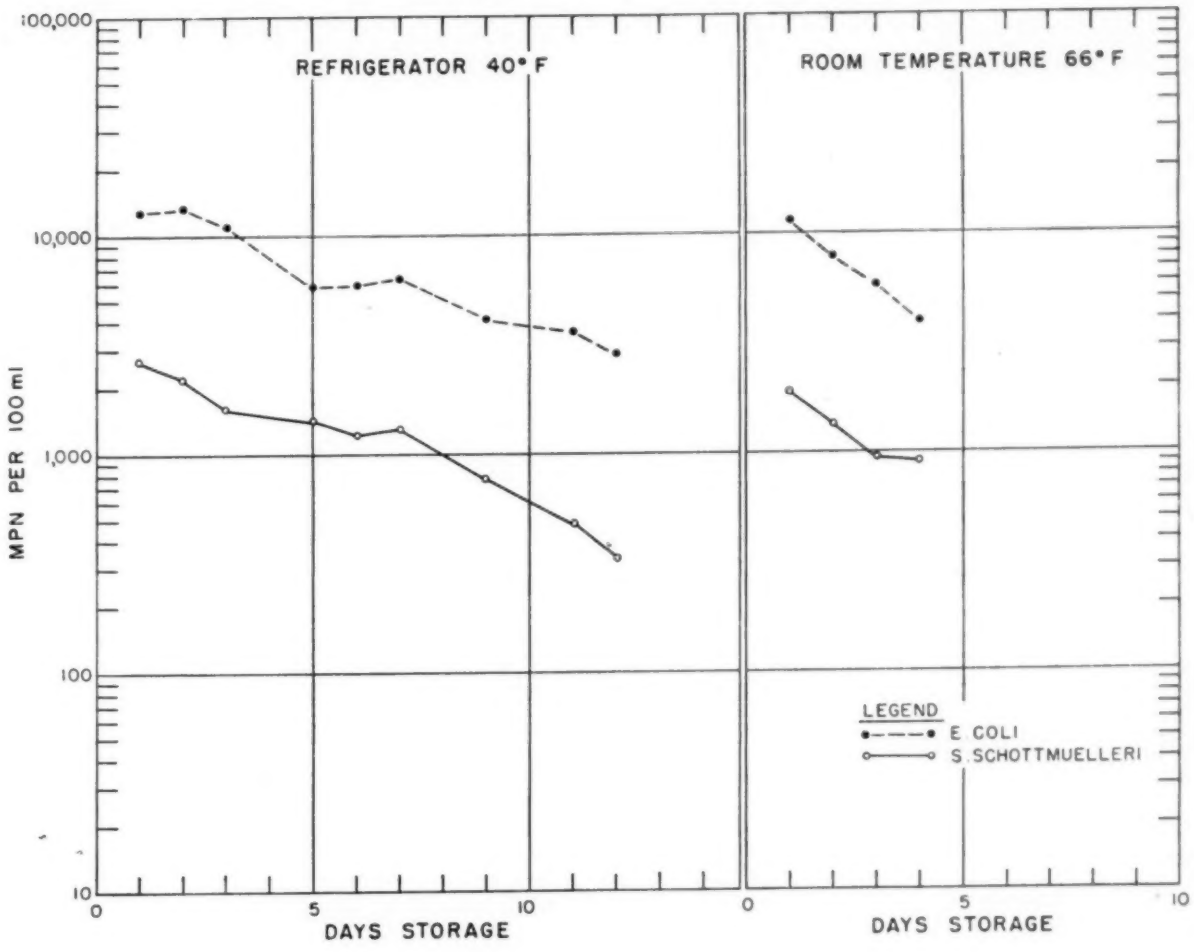
Our comparison of results obtained on refrigerated clams in experiments 3 and 4 indicates a similar rate of decline in numbers of both *E. coli* and *S. schottmuelleri*. The reduction of *E. coli* in the two experiments was not influenced by a more than tenfold difference in initial concentrations.

In experiments 5 and 6, similar results were obtained during the first 10 days of storage. However, at the end of that period, particularly in experiment 5, the clams had deteriorated to a point where they could not be considered suitable for human consumption. In experiment 5, samples which were examined for 2 days after that time showed an increase in numbers of *S. schottmuelleri* but a slight decrease in *E. coli*.

Table 2. Survival of Escherichia coli and Salmonella schottmuelleri in soft clams

Storage temperature	Days of storage	*E. coli* (MPN per 100 ml.)				*S. schottmuelleri* (MPN per 100 ml.)			
		Experiment 3	Experiment 4	Experiment 5	Experiment 6	Experiment 3	Experiment 4	Experiment 5	Experiment 6
40° F. (5° C.)	1	36,000	2,700	17,000	16,000	2,400	1,500	4,800	3,300
	2	40,000	2,700	15,000	19,000	2,200	1,400	3,600	2,400
	3	32,000	1,100	15,000	26,000	1,600	800	3,000	1,900
	4	-------	510	15,000	20,000	-------	500	2,700	1,700
	5	19,000	370	13,000	12,000	1,400	500	3,000	2,000
	6	16,000	900	11,000	7,700	900	570	3,500	1,300
	7	12,000	1,600	12,000	7,700	850	760	3,800	1,100
	8	12,000	1,200	7,000	-------	560	510	2,600	-------
	9	13,000	530	6,000	7,700	640	450	2,000	600
	10	14,000	450	4,200	-------	380	260	1,300	-------
	11	10,000	760	4,900	4,500	380	270	1,900	260
	12	7,200	860	3,800	2,700	330	210	2,500	82
66° F. (19° C.)	1	20,000	3,000	16,000	20,000	1,500	1,100	2,900	2,700
	2	13,000	1,400	9,900	21,000	1,000	690	2,800	1,600
	3	8,900	710	9,900	17,000	730	320	2,800	1,100
	4	-------	330	6,200	17,000	-------	240	2,800	2,200
	5	5,500	330	4,600	-------	310	240	2,100	-------
	6	9,700	520	3,900	-------	130	440	1,900	-------

Figure 2. Survival of Escherichia coli and Salmonella schottmuelleri in soft clams.



A summarization of results of all soft clam storage tests is shown in figure 2. The data are presented as a series of 3-day logarithmic moving averages of all observations on similar days of storage. The results show a reduction continuing at a rate throughout the entire storage period which is quite similar for the two test organisms. *S. schottmuelleri* were recovered in significant numbers after the clams had been stored for 12 days.

The influence of storage at a warmer temperature (66° F.) is also presented in table 2 and figure 2. Reduction of both *E. coli* and *S. schottmuelleri* was similar to that during the same period of storage in the refrigerator. However, after 5 days of storage at the warmer temperatures, the clams deteriorated to an unsalable condition. Many of the animals were gaping and had lost their shell liquor, and in some instances, definite spoilage had started. It was therefore considered that observations made at the end of 5 days could not be interpreted the same as those under conditions which might normally occur in marketable shellfish. In some instances, a sharp de line in the numbers of both organisms occurred; and in others, we observed multiplication of either or both. Reduction of *S. schottmuelleri* and *E. coli* during the significant portion of the storage period was generally parallel.

Summary and Conclusions

The observed survival of *Salmonella schottmuelleri* in shell oysters was similar to that of *Salmonella typhosa* reported by other investigators. The work of Kinyoun (*9*), Krumweide and associates (*10*), and Tonney and White

(*11*) indicates survival of *S. typhosa* for 15 to 60 days in shell stock. The results obtained in the experiments conducted by us at the Public Health Service Shellfish Sanitation Laboratory at Woods Hole, Mass., indicate that *S. schottmuelleri* persists at least as long as *Escherichia coli*, but the rate of reduction of *S. schottmuelleri* during the usual period of storage is not as great as that of *E. coli*.

The reduction of both organisms in stored soft clams proceeded much in a parallel fashion. The rate of reduction at a moderate temperature (66° F.) was generally similar to that at refrigeration temperature (40° F.) during the same period of storage.

Both *E. coli* and *S. schottmuelleri* survived in shell oysters and soft clams which were stored for a period of time at least as long as the shellfish might be in transit from the point of harvesting to consumption.

There was little evidence of multiplication of either *E. coli* or *S. schottmuelleri* in animals that could be considered in marketable condition. Increase in both organisms, on some occasions in the same lot of shellfish, occurred on prolonged storage.

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The Use of Hospital Data In Studying the Association Between a Characteristic And a Disease

By ARTHUR S. KRAUS, M.S.

WHEN STUDYING the possible association between a characteristic and a disease, it is common practice to compare a group of hospital patients suffering from the disease with a control group in the same hospital suffering from other diseases. The objective is to find the proportion of each group possessing the characteristic in question. The control group is usually limited to diseases that can reasonably be assumed to have no relationship with the characteristic. When the characteristic occurs significantly more often in the hospital group with the disease in question, it is concluded that the characteristic is associated with the disease.

The current conclusion that cigarette smoking is associated with lung cancer rests largely on this type of evidence from hospital data.

Berkson (*1*) has discussed the hazards in using such hospital data to reach general conclusions. White (*2*) has more recently discussed a wide range of sampling problems in medical research, including those involved in hospital samples. While these authors have correctly indicated the need for caution when drawing conclusions from hospital samples, there may exist at present an oversuspiciousness regarding all conclusions based primarily on hospital data. The study of hospital groups is usually the most convenient and often the only way to obtain information pertinent to the problem under consideration. This paper indicates some of the circumstances under which valid conclusions can be drawn from hospital data.

Mr. Kraus is a biostatistician with the New York State Department of Health.

If the Characteristic Is a Disease

Berkson illustrated the problem with a hypothetical example dealing with the possible role of cholecystic disease as a causative or aggravating agent in diabetes. Hospital diabetes cases were compared with hospital cases with refractive errors (the control group), regarding the proportion with active cholecystic disease. He showed that an apparent association between diabetes and active cholecystic disease could be found when no such association existed in the population as a whole, because of the ordinary compounding of the independent probabilities that individuals with each of the three diseases would come to a hospital. Spurious correlations would be especially likely if the probability of a diabetes case coming to a hospital differed considerably from the probability of a refractive error case coming to a hospital. However, the risk of spurious correlations was great in this problem primarily because the characteristic under study, cholecystic disease, was itself an active disease with a fairly high probability of bringing those who have it to a hospital. I agree with Berkson and with White that in a study of the possible relationship between one active disease and another active disease, each with a fairly high probability of bringing cases to a hospital, there is a considerable risk of finding a spurious correlation among hospital series of cases.

If the Characteristic Is Not a Disease

Let us consider the more frequent class of problems in which the characteristic under study is not an active disease with a symptomatology that is likely to bring those who have

it to a hospital. The possible association between the characteristic, smoking, and lung cancer or between the characteristic, physician, and heart disease are examples.

In the lung cancer problem, we want to know if the prevalence rate of lung cancer is significantly higher among smokers than among nonsmokers of comparable age and residence. Owing to the difficulties of following healthy smokers and nonsmokers until enough get lung cancer to permit a conclusion to be drawn, the problem is first approached by asking what proportion of lung cancer cases smoke in comparison to the rest of the population of comparable age. Cornfield (*3*) has shown that if the proportion of smokers among lung cancer cases is higher than among the rest of the population, it follows that the lung cancer prevalence rate among smokers is higher than among nonsmokers.

Because of the difficulties in obtaining for interview nonhospital lung cancer cases, or nondiseased controls of comparable age and residence, a hospital sample of lung cancer cases and a hospital control group is usually involved in the study. A number of such studies have shown a significantly higher proportion of smokers among lung cancer cases than among controls, no matter what disease groups were included in the control. The question arises as to whether the probabilities of lung cancer cases or of smokers coming to a hospital are such as to cause a spurious correlation among hospital groups, when no such correlation exists in the population.

Let us assume that for a population of 1 million table 1 represents the true proportion of smokers and of lung cancer cases, with no association between the two. If smoking does not influence the chance of a person being in a hospital, then hospital data will show the same relationship between lung cancer and smoking that exists in the population, as Berkson and White have both pointed out. Table 2 illustrates this situation, under the assumptions that 50 percent of the lung cancer population is hospitalized at a given time and that 0.5 percent of both the smoking and nonsmoking population with no lung cancer is hospitalized at a given time for a set of diseases obviously unrelated to smoking and thus suitable for a control group.

Table 1. Lung cancer and smoking in population X

	Smokers	Nonsmokers	Total	Percent smokers
Lung cancer cases	600	400	1, 000	60
Rest of population	599, 400	399, 600	999, 000	60
Total	600, 000	400, 000	1, 000, 000	60

Table 2. Lung cancer and smoking in hospitals serving population X

	Smokers	Nonsmokers	Total	Percent smokers
Lung cancer cases	300	200	500	60
Control cases	2, 997	1, 998	4, 995	60
Total	3, 297	2, 198	5, 495	60

In table 2, the relationship between lung cancer and smoking in a hospital group is the same as in the population of table 1, namely, there is no correlation. The important point is that our assumption that smoking per se does not change the probability of hospitalization is most probably correct. In Berkson's illustration, cholecystic disease itself was likely to bring a person to a hospital. He assumed that even if diabetes were unrelated etiologically to cholecystic disease a person who had both cholecystic disease and diabetes would have a greater chance of hospitalization than one who had diabetes alone and similarly for a person with both cholecystic disease and refractive errors. This assumption, which resulted in the possibility of spurious associations in hospital data, is untested and may or may not be true. However, the probability of hospitalization for a smoker with lung cancer is based on the nature of his disease and not on his habits of life. Thus, he should have the same chance of hospitalization as a nonsmoker, of comparable age and economic status, with the same kind of lung

cancer. Similarly, a smoker with a control disease has the same chance of coming to the hospital as a nonsmoker with the same disease.

Smoking may be etiological in various diseases. However, whether it is etiological for a certain disease or not, smoking adds nothing to the probability of hospitalization for a person with such a disease, and it certainly doesn't cause a person without disease to come to a hospital. Smoking thus belongs in the category of characteristics which have no probability by themselves of hospitalizing a person. Thus hospital data will not show any spurious correlations involving smoking, where none actually exist. Similarly, it would appear that any other characteristic which is not itself a disease condition, such as occupation, diet, physical activity, and habits of life can be studied for etiological significance in particular diseases, using hospital data, without the risk of spurious correlations of the type illustrated by Berkson. This is the type of characteristic under study in a large part of chronic disease research.

If Characteristic Is Related to Control

If we mistakenly include in the control group of diseases in the hospital sample a disease which has an unsuspected etiological relationship to the characteristic under study, we will tend to decrease the chance of demonstrating a positive correlation between the characteristic and the disease we are studying, when such an association actually exists. This is illustrated in tables 3 and 4. Table 3 represents a population with a true association between smoking and lung cancer. In table 4, it has been assumed that 1.4 percent of non-lung-cancer smokers in population Y are hospitalized for the diseases included in the control group, while only 0.5 percent of the non-lung-cancer nonsmokers are hospitalized with these diseases. This difference is due only to a higher prevalence rate of the control diseases among smokers, and not to smoking increasing the chance that an individual with one of these diseases will enter a hospital. It is still assumed that 50 percent of all lung cancer cases are hospitalized. By assuming that the ratio of hospital prevalence of the control diseases among smokers compared to nonsmokers was as high as the ratio of hospital prevalence of lung cancer among smokers compared to nonsmokers, we were able to completely obscure in the hospital sample the true association of lung cancer with smoking that pertained in the population. Inclusion in the control of one or two important diseases with some true but unsuspected association with smoking might thus make a true association between lung cancer and smoking appear statistically insignificant in a hospital study.

Table 3. Lung cancer and smoking in population Y

	Smokers	Nonsmokers	Total	Percent of smokers
Lung cancer cases	800	200	1, 000	80. 00
Rest of population	599, 400	399, 600	999, 000	60. 00
Total	600, 200	399, 800	1,000,000	60. 02
Prevalence of lung cancer (per 100,000 population	133. 3	50. 0	100. 0	

Table 4. Lung cancer and smoking in hospitals serving population Y

	Smokers	Nonsmokers	Total	Percent of smokers
Lung cancer cases	400	100	500	80. 0
Control cases	8, 392	1, 998	10, 390	80. 8
Total	8, 792	2, 098	10, 890	80. 7

However, it would seem that in studying the association of smoking and lung cancer in hospital samples, the inclusion of diseases in the control which had an unsuspected relationship to smoking could cause error in one direction only. A true association between lung cancer and smoking might be obscured, but a spurious positive correlation should not appear if no true correlation exists. Smoking should have either no etiological significance or a positive etiological significance for any disease in the hospital control group, but it could hardly be expected to provide specific protection against any of the important diseases in that group. Therefore,

the finding of repeated significant associations between smoking and lung cancer in hospital studies indicates a true association in the population, regardless of the composition of the control groups used in the hospital studies. When studying the possible etiological relationship between some other characteristic and some other disease, by the use of hospital samples, one should be sure that the characteristic is not suspected of being a protective agent against any of the diseases included in the control. If it is, a spurious association between the characteristic and the disease under study might appear in the hospital sample.

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Immunization Information for International Travel

Persons planning cruises, including world cruises, touching the yellow fever infected countries, Trinidad, Venezuela, Colombia, and Honduras, are reminded by the Division of Foreign Quarantine of the Public Health Service of the necessity of possessing a valid yellow fever certificate. A valid certificate will be required at the next port of call from anyone who has touched any of these countries. In addition, anyone expecting to stay in any part of Central America should have a yellow fever vaccination for his own protection.

The yellow fever vaccination requirements are presently being strictly enforced in all Caribbean area ports on account of the appearance of yellow fever in many places where it had not been heard of for over 20 years. They are also strictly enforced by the Union of South Africa, Egypt, India, and Pakistan.

Travelers coming directly from the United States can enter some, but not all, yellow fever infected areas without presenting a yellow fever vaccination certificate, but usually they cannot leave again without receiving yellow fever vaccination. Presentation of a valid certificate is compulsory for departure from Trinidad and Colombia, and probably also from certain ports of Venezuela.

A yellow fever vaccination certificate does not become valid until 10 days after vaccination (in India and Pakistan, after 12 days). The certificate is valid for 6 years, except in Curacao, Aruba, and other Dutch possessions, where it is valid for only 4 years.

Clinical Resources in Small Hospitals

In order to determine whether small hospitals can provide a variety of experiences for student nurses, the Division of Nursing Resources of the Public Health Service designed a method for collecting data on discharge diagnoses and classifying them according to the similarity of nursing problems they present. This method is described and results of its field trial are reported in Public Health Monograph No. 24.

There is much of value for student nurses in receiving part of their experience in small hospitals. The contacts between the student nurses and the personnel of small hospitals are helpful to the clinical instructors in the nurses' home hospital. Through the student nurses, the clinical instructors have opportunity to establish relationships with patients' families and with community agencies and organizations. The small hospital also offers the student experience which is similar to that which she will find in a large number of the hospitals in which she may practice later as a graduate nurse, since at least 66 percent of the general hospitals in the United States have an average daily patient census of 100 or less.

The method used in this study consists of collecting diagnoses of patients discharged from hospitals, classifying the diagnoses by similarity of nursing problems, and comparing by statistical analyses the nursing problems of patients in small versus large hospitals to determine the value of small-hospital student experience.

The method of classifying the many different discharge diagnoses according to nursing problems consists of placing diagnoses together in a group when the following conditions are similar: (*a*) the major physical needs of the patient; (*b*) emotional problems, such as anxiety, depression states, and adjustment situations; and (*c*) rehabilitative measures involved in the therapeutic plan. When a diagnostic condition presents nursing problems similar to those of one of the diagnostic groups, but the disease syndrome is especially important for the student to recognize, the condition is placed in a separate diagnostic group.

This method was tested in a pilot study in

Public Health
MONOGRAPH

No. 24

The accompanying summary covers the principal findings presented in Public Health Monograph No. 24, published concurrently with this issue of Public Health Reports. The authors are with the Division of Nursing Resources of the Public Health Service.

Readers wishing the data in full may purchase copies from the Superintendent of Documents, Government Printing Office. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and the major universities and in selected public libraries.

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Abdellah, Faye G., and Levine, Eugene: Appraising the clinical resources in small hospitals. Public Health Monograph No. 24 (Public Health Service Publication No. 389). 39 pages. U. S. Government Printing Office, Washington, D. C., 1954. Price 30 cents.

Virginia. Thirty general hospitals of various sizes were included. The discharge diagnoses of patients discharged over a 4-day period were collected. This survey yielded a total of 1,915 discharged patients. Only primary diagnoses were used for classifying the diagnoses of these patients into 58 different nursing problem groups. Analyses of these groups showed that small hospitals in Virginia provide a suitable variety of experiences for student nurses.

The monograph contains a detailed description of how the diagnoses are grouped according to the nursing problems presented and suggests the usefulness of the method in studying clinical resources for selecting student experience in other fields besides nursing.

technical publications

The Living Waters

Public Health Service Publication No. 382. 1954. 24 pages; illustrated. 15 cents.

The text of this booklet on the importance of conservation of water through pollution control describes the evolution of water uses by man, how the problem of pollution arose, and how the problem can be solved. The booklet explains the sources and effects of pollution, how sewage treatment plants work, and the necessity for action against pollution, particularly in view of the expected population and industrial growth.

The booklet is designed primarily for use in junior and senior high schools. Each of the six sections concludes with a group of questions for discussion.

Drinking Water Disinfection

A guide for the individual

Public Health Service Publication No. 387, Health Information Series No. 74. 1954. 2-fold leaflet; illustrated. $2.50 per 100.

How travelers, tourists, campers, or hikers away from the protection of inspected water supplies can provide themselves with safe drinking water is the subject of this leaflet. Such persons are advised to learn how to make the water safe to drink and to take the time to do so.

Vigorous boiling of water is recommended as the most positive method by which water may be made bacterially safe to drink. When boiling is not feasible, chemical treatment, if applied with care, also will make most water free from bacterial contamination. Methods of water treatment by iodine, commercial hypochlorite solutions, and chloride of lime are described.

Refuse Collection and Disposal for the Small Community

A joint study and report of the Public Health Service and the American Public Works Association. 1953. 39 pages; illustrated. Available only from the American Public Works Association, 1313 East 60th Street, Chicago. $2.

More than 33 million persons in the United States live in some 8,400 urban and rural communities of from 1,000 to 25,000 population. While the trend toward urbanization and concentration has brought many advantages, it has also brought problems, including those of providing sanitary refuse storage, collection, and disposal. Surveys have shown that many small communities do not follow sanitary refuse practices, in part because of the belief that adequate service is too expensive and because of lack of information on how to establish and operate a satisfactory system.

This publication, prepared jointly by the Public Health Service and the American Public Works Association, describes certain factors which need to be considered in establishing sanitary refuse practices, and presents representative operational and cost data in such manner that these data may be interpreted to meet local conditions.

The material contained herein covers such points as authorization to proceed and definitions of refuse, garbage, ashes, and rubbish. Methods of storage, collection, and disposal are described, showing illustrations of various types of collection trucks, methods of storage, and systems of sanitary landfills. Financing is considered in both text and chart form.

Appendixes include selected references and bibliography, a test solution for a town of 2,000 population, and suggested ordinances governing refuse storage, collection, and disposal.

This section carries announcements of all new Public Health Service publications and of selected new publications on health topics prepared by other Federal Government agencies.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications issued by other agencies.

Social Class Variations in Mortality

By W. P. D. LOGAN, M.D., Ph.D., D.P.H.

AN ANALYSIS of mortality in England and Wales in 1950 in what are customarily called the Registrar General's social classes has just been completed. The basic unit of the social class grouping is the occupational group. Every occupation in the country, of which there are many thousands, is assignable to one or another of 586 occupational unit groups. These 586 occupational groups are each assigned as a whole to one or another of 5 social classes, on the basis of the predominant characteristics of the majority of the persons in the unit group. The social class grouping is thus not a classification of individuals, and in assigning an individual to the appropriate social class no account is taken of personal circumstances other than occupation. Once the occupation of the individual has been established, the social class grading follows automatically.

In the 1951 census, 3.3 percent of the men aged 15 years and over were in social class I (professional occupations), and 15.0 percent were in class II (intermediate occupations); 52.7 percent were in class III (skilled occupations); 16.2 percent were in class IV (partly skilled occupations); and 12.8 percent were in class V (unskilled occupations).

Dr. Logan, medical statistician of the General Register Office of England and Wales, London, presented the full text of this summary report at the World Population Conference in Rome, August 30–September 10, 1954. The full text has also been published in the British Journal of Preventive and Social Medicine, vol. 8, No. 3, July 1954.

Development of Social Class Studies

In the same way that the social classes are constructed on the basis of an occupational classification, the study of social class mortality variations is a development from the study of mortality in individual occupational groups. It is just over 100 years since the first official study of occupational mortality in England and Wales was undertaken. This was an analysis of deaths from all causes in 1851 in several hundred occupations, related to the populations of these occupations as determined by the 1851 census (*1*). Similar studies were made of deaths in 1860–61 in relation to the 1861 census, and thereafter, at 10-year intervals, in and around each successive census year, standardized death rates having been introduced to allow for differences in the age structure of different occupations and separate causes of death studied.

In 1910–12, the occupational mortality analysis distinguished 132 occupational groups and 27 causes of death at ages 25–64 (*2*). In this analysis, and also in a study of infant mortality in 1911 (*3*), the various occupations were for the first time grouped together into social classes, of which on this occasion there were 8, the first 5 having been graded in much the same way as described above.

In 1921–23 (*4*), deaths were tabulated for 40 causes in 164 occupational groups, the occupational classification having been considerably improved and made more properly occupational as distinct from industrial, as it had previously tended to be. Five social classes only were distinguished; classes VI to VIII of the previous classification were merged with the others (*5*).

The last previous occupational mortality analysis was made for the years 1930–32 (*6*). For men, this was on the same lines as before but with further increase in the detail of causes of death and of occupations. A very important innovation at that time was the study of the mortality of single women classified by their own occupations, and of married women classified by occupation of husband. There are some special difficulties in studying the occupational mortality of single women. For example, many are unoccupied or are only transitorily in employment, and it was because of these difficulties that they had not previously been included. I would not like to claim that their inclusion in 1930–32 has really got us very far.

Analyzing the mortality of married women according to husband's occupation was, however, a great step forward. It has allowed comparison between the mortality of men in particular occupations and of their wives, who generally share the same socioenvironmental circumstances as their husbands but are not usually exposed to the husbands' occupational hazards or disadvantages. It thus became possible in 1930–32 to begin to distinguish between mortality risks that were primarily of occupational origin (though not necessarily due to direct occupational hazards) and those arising rather from the socioeconomic environments in which people in various kinds of occupations tend to live (*7*).

Limitations of This Method

There are well-recognized limitations in the study of occupational mortality and, to a less extent, of social class mortality, by the method traditionally employed. This method depends on the relating of occupational information obtained at death registration to occupational information derived from the census. These limitations have been discussed in great detail in the various official reports, and I shall only mention two.

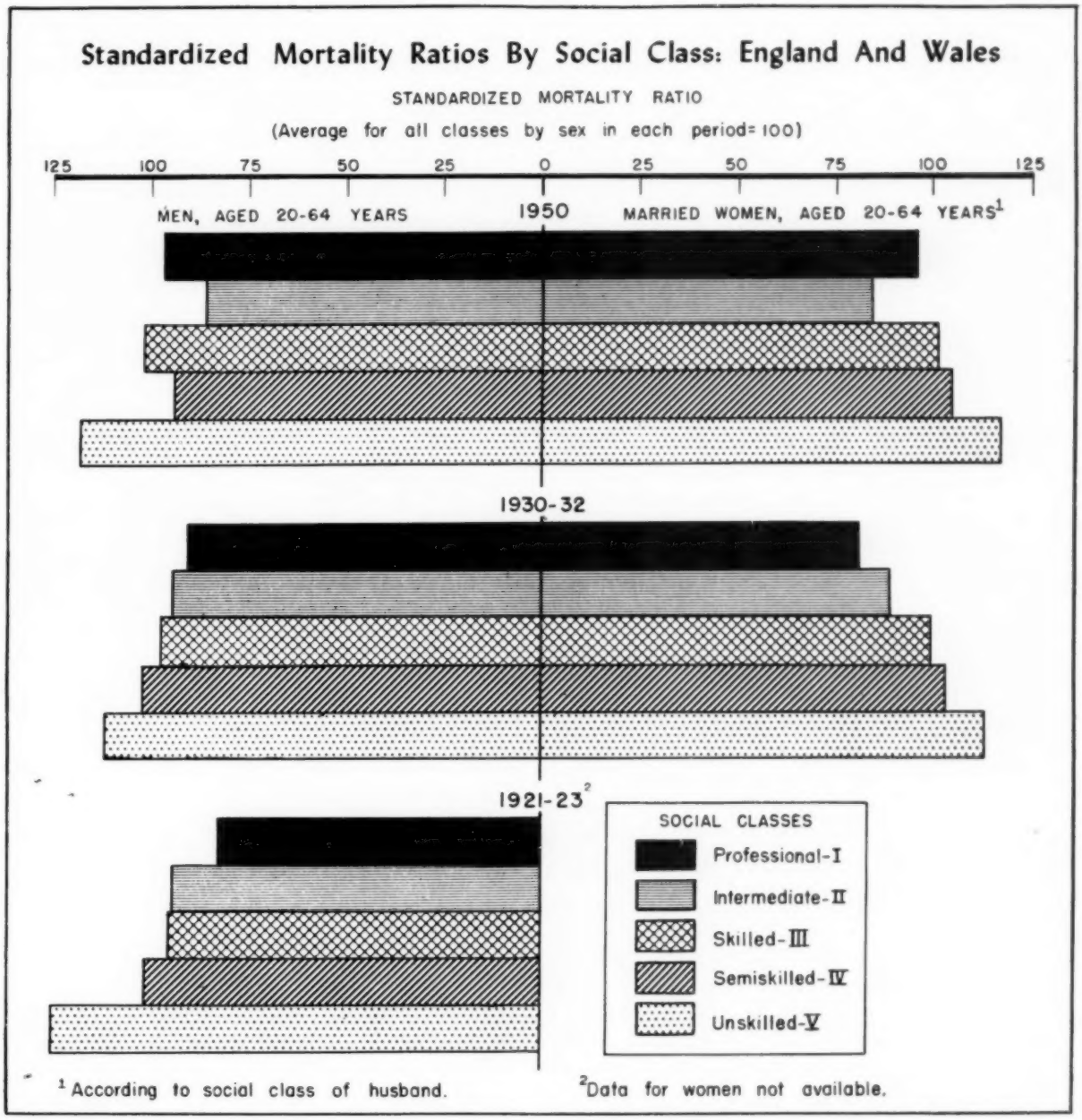
One type of error can arise from differences between the occupational description given by an individual himself on the census schedule and that given by a relative when registering the person's death. The individual probably knows best what his occupation really is but may not describe it properly or in sufficient detail on the census schedule, whereas at death registration the registrar is in a position to elicit details, including information about the previous occupation of a retired person, but occasionally the informant may not have sufficient knowledge to provide the information accurately.

A different type of difficulty arises in attempting to interpret the recorded mortality rates; it then becomes necessary to consider the extent to which an apparently high or low mortality rate recorded for an occupation may be due to physically or medically selective recruitment or discharge. An occupation such as the police may recruit only the physically fit, whereas other types of occupations may attract or become the refuge of invalids or persons of poor physique. The recorded mortality rates for such occupations might reflect the type of people engaged therein more than the risks of the occupation itself. Furthermore, the recorded mortality rate of a dangerous or of a physically onerous occupation may be understated owing to persons in failing health transferring to a less exacting job sometime before they die.

The 1950 Analysis

The latest England and Wales analysis deals with deaths in 1950 (*8*) related to the 1951 census 1-percent sample results. It constitutes a preliminary and much restricted survey of what we may expect to find in the full analysis which will shortly be commenced and which will cover deaths in the 5 years, 1949–53, probably in greater detail than ever for occupations and for causes of death. But, as this full analysis will not be completed for several years, and as it is now more than 20 years since the last one was made, it seemed desirable to take advantage of the opportunity offered by the 1-percent sample population data by preparing some advance tabulations, deliberately limited to the main social classes, and some major divisions of these, and to a few of the most important causes of death.

The accompanying chart compares the standardized mortality ratios of men aged 20–64 in the 5 social classes in 1950 with those recorded in 1921–23 and 1930–32. The same comparison



is made for married women for 1950 with 1930–32. The standardized mortality ratio is the number of deaths of men or the number of deaths of women, classed to a particular occupational or social group, expressed as a percentage of the number that would have occurred if the group had experienced at each separate age the death rates of all groups of men (or women) of corresponding age. In other words, the standardized mortality ratio is an age-standardized occupational mortality index which shows how far the mortality of a particular occupation or social class differs from the general average.

In 1921–23 and 1930–32, there was an uninterrupted upward gradient of mortality from social class I (professional) to social class V (unskilled). In 1950, the gradient was much less regular, the lowest ratios being given by social classes II and IV. All kinds of suggestions might be made to explain this departure in 1950 from the former regular gradient. But

remembering that the ratios have been calculated on the number of deaths for only 1 year, as numerator, and on a 1-percent census sample, as denominator, it would be advisable to await more comprehensive figures before exploring the various possibilities in detail. However, I find it difficult to believe that the irregular trend can have arisen only as a result of random fluctuation in the figures.

The social class mortality gradient for married women has also become less regular in 1950 than it was in 1930–32, the only previous occasion on which this group has been studied. However, only social class II was out of step; the others increased from class I to V.

Individual Causes of Death

Mortality from more than 30 causes of death has been tabulated for 1950, and table 1 shows

Table 1. Standardized mortality ratios by cause and social class for men and married women aged 20–64 years: England and Wales, for specified time periods

Cause of death and year	Men					Married women				
	Social class					Social class				
	I	II	III	IV	V	I	II	III	IV	V
All causes:										
1921–23	82	94	95	101	125	[1]	[1]	[1]	[1]	[1]
1930–32	90	94	97	102	111	81	89	99	103	113
1950	97	86	102	94	118	96	84	101	104	117
Respiratory tuberculosis:										
1921–23	49	81	95	97	137	[1]	[1]	[1]	[1]	[1]
1930–32	61	70	100	104	125	52	67	99	106	132
1950	64	62	103	95	149	*43*	52	104	107	166
Cancer of stomach:										
1921–23	60	82	100	106	130	[1]	[1]	[1]	[1]	[1]
1930–32 [2]	[3] 59	[3] 84	[3] 98	[3] 108	[3] 124	54	78	104	104	121
1950	57	67	100	114	132	*57*	72	101	106	138
Cancer of lung:										
1921–23	100	109	97	79	124	[1]	[1]	[1]	[1]	[1]
1930–32	107	95	100	92	114	*95*	100	108	81	94
1950	80	79	108	89	116	*120*	94	104	96	91
Cancer of breast:										
1930–32	[4]	[4]	[4]	[4]	[4]	136	116	103	84	82
1950	[4]	[4]	[4]	[4]	[4]	144	100	106	76	97
Cancer of cervix uteri:										
1950	[4]	[4]	[4]	[4]	[4]	*61*	69	98	109	150
Leukemia:										
1930–32	153	125	96	94	85	*167*	118	107	76	76
1950	*153*	101	107	81	88	*145*	*73*	110	*91*	*95*
Coronary heart disease:										
1930–32	[3] 237	[3] 148	[3] 95	[3] 66	[3] 67	157	126	93	85	88
1950	150	110	104	79	89	92	93	101	100	108
Myocardial degeneration:										
1930–32	[3] 77	[3] 92	[3] 94	[3] 105	[3] 122	54	75	99	110	129
1950	67	82	97	98	137	*66*	67	98	120	134
Bronchitis:										
1921–23	26	55	94	121	177	[1]	[1]	[1]	[1]	[1]
1930–32	31	57	91	124	156	*27*	56	99	119	155
1950	33	53	97	103	172	*33*	48	100	130	152
Diabetes mellitus:										
1921–23	125	145	92	75	66	[1]	[1]	[1]	[1]	[1]
1930–32	122	155	95	82	69	56	89	104	108	106
1950	*167*	97	97	91	*108*	*86*	88	98	109	117

[1] Data not available. [2] Includes esophagus. [3] Ages 35–64 years only. [4] Data not applicable.

NOTE. All social classes=100 in each specified group. Social class of married women grouped according to husband's occupation. Ratios based on less than 50 deaths are italicized. Social class groupings: I—professional, II—intermediate, III—skilled, IV—semiskilled, V—unskilled occupations.

SOURCE: See reference 8.

how the results for a few of these causes compare with earlier findings. Ratios calculated upon less than 50 actual deaths are italicized to indicate that their significance is uncertain.

Respiratory tuberculosis. For men aged 20–64, the steeply rising gradient from social class I to V seen in 1921–23 and again in 1930–32 has been repeated in 1950, but with the ratios for classes II and IV rather lower than those for classes I and III, respectively. The gradient for married women aged 20–64 has remained steep and regular.

Cancer of stomach. Each of the series of ratios indicates a regular gradient of increasing mortality from social class I to V. The steepness of gradient has remained unchanged since 1921–23.

Cancer of lung. In the two previous analyses, the evidence for an association between cancer of lung and social class was somewhat equivocal, but the 1950 figures for men aged 20–64 seems fairly definitely to suggest a rising gradient from social class I to V. There are no signs, however, of a similar gradient among married women.

Cancer of breast and of cervix uteri. The first of these two conditions displays a very definite gradient downward from social class I to V for married women. The second condition displays an opposite tendency, with lower mortality among the married women of class I and the highest mortality in class V. Cancer of these two sites is known to be correlated with childbearing. Mortality from cancer of the breast is lower and from cancer of the cervix higher among women who have borne children than among those who have not, the number of children borne being also important. It is likely therefore that the much higher fertility of classes IV and V over classes I and II goes a long way toward explaining the social class mortality pattern of these two diseases. Whether it is the whole explanation, I cannot at present say; it is something that will have to be looked into further.

Leukemia. This is one of the diseases that give a fairly definite downward gradient of mortality from social class I to class V, in both sexes, though many of the ratios shown in table 1 are based on inadequate numbers. Better diagnosis in class I than in V may be the explanation, in the same way that it may be the explanation of the steady increase year by year in the numbers of deaths that are being recorded; on the other hand, it may not.

Coronary heart disease. In 1930–32, mortality from this cause was decidedly higher in social classes I and II than in classes IV and V in both sexes. In 1950, this gradient is still quite evident for men, but for some reason the ratios for women aged 20–64 run in the opposite direction, that is, upward from class I to V instead of downward. What the explanation is of this sex difference, I have no idea. To account for the male pattern of gradient, the suggestions that have been made from time to time include social class and occupational differences in death certificate terminology, in mental stress, in dietary habits, and in physical activity. My own leaning at present is toward a combination of the last two.

Myocardial degeneration. The mortality ratios for this condition among men aged 20–64 run in the opposite direction to those for coronary disease, that is, they are lowest in social class I and increase to class V; and the gradient for women is the same as for men.

Bronchitis. This disease gives the steepest and most uniform social class mortality gradient of all, with mortality at ages 20–64 roughly 5 times higher in social class V than in class I. Clearly, this is something that has to be taken into account in any studies of geographic variations in the incidence of bronchitis in relation, let us say, to climate or to atmospheric pollution.

Diabetes mellitus. I have included this condition in order to show that the sex difference in the social class mortality gradient observed in 1930–32 has remained as evident in 1950. For men, mortality is highest in social class I and declines toward social class V. In women, the gradient runs in the opposite direction.

Stillbirths and Infant Mortality

The infant mortality rate, as has often been pointed out, is a sensitive index of social conditions, particularly with regard to the postneonatal period, that is, from 4 weeks of age up to 1 year, where, as table 2 shows, the death rate is persistently 4 times higher in social class V than in class I. It is worth noting that in

Table 2. Comparative ratios for stillbirth rates, neonatal (under 4 weeks) and postneonatal (4 weeks to 1 year) mortality rates by social class of father: England and Wales, for specified time periods

Ratio and year	Social class				
	I	II	III	IV	V
Stillbirth:					
1939	67	92	98	104	110
1950	75	87	99	109	117
Neonatal mortality:					
1921	69	83	99	108	109
1930–32	72	90	97	106	108
1950	71	90	97	109	121
Postneonatal mortality:					
1921	33	60	95	117	133
1930–32	35	57	90	111	142
1950	44	54	94	124	168

NOTE: All social classes=100 in each specified group. Data for legitimate births only. Ratios computed from stillbirth rates per 1,000 live births and stillbirths combined, and from neonatal and postneonatal mortality rates per 1,000 live births. Social class groupings: I—professional, II—intermediate, III—skilled, IV—semiskilled, V—unskilled occupations.

SOURCE: See reference 8.

spite of the tremendous reduction of infant mortality rates during the past 30 years there has been absolutely no narrowing of the difference between the various social classes, that is, no tendency for the gradient to become less steep.

There has likewise been no tendency for the social class differences in stillbirth and neonatal (under 4 weeks) mortality rates to become less in recent years. The gradient is much less steep for stillbirths and neonatal deaths than for deaths occurring later in the first year of life.

Conclusion

As a postscript to this abridged review of occupational and social class mortality variations in England and Wales, I should like to add a word about the value of this kind of analysis. To tabulate one or several years' death by sex, age, occupation, and cause and to calculate corresponding mortality rates is a big job which could only be justified if the results were really worth having and served a useful purpose whether for administration or for research. On what grounds, then, are these large occupational mortality analyses really justifiable?

Greenwood (*9*) certainly thought they were justified when he described them as "the most valuable single instrument of sociomedical research our national armory contains."

It cannot be claimed that our occupational mortality studies have revealed many specific industrial hazards that were not already known. The sandblasting risk, for instance, was not discovered by the revelation in the official mortality tables that those who followed this occupation were subject to an exceptionally high mortality. In respect of occupations such as this which have a well-known special hazard, the tabulations have confirmed rather than discovered the hazard. In addition, however, they have allowed comparisons to be made from time to time and between one occupation and another.

Sandblasting, we know, is or was dangerous. Is it, or was it, more dangerous than hotelkeeping? In 1930–32, sandblasting was much more dangerous. The respective standardized mortality ratios were 304 and 155. Coal gas workers and medical practitioners, who also suffer certain occupational risks, had standardized mortality ratios of 115 and 106, but the Anglican clergy, evidently having a less dangerous occupation, had a standardized mortality ratio of 69. We are thus given the opportunity of getting different occupations into perspective so that the relative risk can be appraised as between one occupation and another.

By grouping together occupations that seem to enjoy much the same living standards, we are able to show that "mortality is influenced more by the conditions of life implied by various occupations than by the direct occupational risks entailed" (*4*). This approach to the study of mortality variations has been greatly advanced by the decision in 1930–32 to take account also of the mortality of married women.

The cynic can of course remark, after it has been shown that a disease is closely correlated with adverse living conditions, there is little more that we can do about it. It is admittedly beyond the ordinary powers of physicians to transfer their patients from social class V to class I and so relieve them of some of their

bronchitis, tuberculosis, and myocardial degeneration (although increasing their risk of coronary thrombosis in return). But this is quite the wrong approach. Having discovered that the mortality from a disease is influenced to a significant degree by so-called social conditions, as our next step we should study these conditions in the greatest possible detail to determine precisely by what mechanism the behavior of a disease is different in one group of people from that of another, or in what way one group is receiving an advantage or a disadvantage that the other group does not have. It may even be practicable, with the recognition that the risk from a disease is greater in one group than in another, to take special precautions for the individuals within the vulnerable group and so reduce their risk.

A third contribution that these occupational and social class mortality studies make is the additional information they provide about the natural history of disease—their contribution to epidemiology and to the application of the epidemiological method. The observation that coronary disease kills men in professional and managerial occupations much more than those doing unskilled work, although not revealing the cause or causes of the disease, has at least provided some useful leads. Even if the pursuit of such leads does not in fact prove fruitful, whenever any hypothesis is propounded about the pathogenesis of a disease, that hypothesis, to be accepted, must adequately account for at least the majority of the already established epidemiological features.

For reasons such as these, I myself have no doubts about the fundamental value of these extensive occupational mortality studies as an instrument of medical research and, despite their various special limitations, I believe that these studies will be needed periodically for a long time to come.

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Today's Health Problems And Health Education

By MAYHEW DERRYBERRY, Ph.D.

THE HEALTH PROBLEMS of greatest significance today are the chronic diseases and accidents—in the home, at work, and on the highway. Large-scale epidemics, their investigation, and their control no longer demand the major attention of public health workers.

The extent of chronic diseases, various disabling conditions, and the economic burden which they impose have been thoroughly documented by the Committee on Interstate and Foreign Commerce of the United States House of Representatives (*1*). Health education and health educators will be expected to contribute to the reduction of the negative impact of such major health problems as heart disease, cancer, dental disease, mental illness and other neurological disturbances, obesity, accidents, and the adjustments necessary to a productive old age.

The new and unique role of health education in helping to meet these problems can perhaps be clarified through a review of some of the differences between procedures that have been successful in solving the problems of the acute communicable diseases and those that are available for coping with today's problems.

Dr. Derryberry is chief, Public Health Education Branch, Division of General Health Services, Public Health Service. *This paper is condensed from one read before the American Academy of Physical Education, New York, N. Y., April 14, 1954.*

Disease Prevention

The tools for dealing with the health conditions of today are not as specific and precise as those that have been available for the contagious diseases. The medical and sanitary sciences have provided public health workers with specific measures for prevention of these diseases—vaccination, immunization, safe water and milk supplies, sanitary sewage disposal, and insect vector control. When properly utilized, these measures have protected people from the several communicable diseases. But even in situations in which individuals do not avail themselves of these protective measures and contract a given disease, there are antibiotics and other chemotherapy agents that are specific and effective. No such specifics exist for preventing the chronic diseases, the degenerative conditions of old age, or accidents.

Medical science has, however, made possible the prevention of the more serious consequences of many of the chronic diseases. Seegal and his co-workers (*2*) listed 16 chronic diseases which medicine can now control by early diagnosis and treatment and 35 chronic conditions which are subject to partial control. No specific preventive is available for accidents or obesity other

than changes in behavioral patterns. For older persons, the only procedures known at present to prevent physical and mental deterioration are adequate attention to their physical and mental health needs and providing them with opportunities for activity and usefulness.

Closely related to the lack of specific and precise methods of dealing with the chronic diseases is the difference in the manner in which these diseases occur. The onset of the chronic conditions is much more insidious than was the onset of the acute conditions such as the contagious diseases, from which the patient became seriously ill in a very short time and either recovered quickly or died. Therefore, the motivation to act with reference to the slowly developing problems of chronic disease is not nearly so great as was the motivation to act in preventing the contagious diseases.

Because the onset of a chronic condition is gradual, education regarding the accompanying physical changes is difficult. Early detection of the disease means that the individual must either take routine examinations or tests when he feels perfectly well, or else he must become skilled in detecting in himself slight deviations in functioning and seek attention before the disease or condition has progressed too far.

Obstacles to Health Education

For many reasons, the task of health education, which is normally difficult enough, is made much more difficult by the lack of specific procedures for preventing today's ills, as well as by the absence of completely effective curative measures. Because control procedures are vague, the actions which health educators try to teach individuals to take to prevent or to cure disease are less well defined than were the actions necessary to control the contagious diseases. The relationship between the desirable actions and the effective control of chronic disease is, by the same token, much less obvious to the public eye.

There are additional difficulties in stimulating appropriate individual action to prevent or control the chronic diseases. A single action, such as being vaccinated or immunized, protects a person for a period of time—often for a long period of time—whereas the actions which must be taken to prevent further disability from a chronic disease often require a complete change in the pattern of one's daily living. Changing one's diet and changing the kinds and amounts of physical and mental activity permitted require radical readjustment in an individual's life.

Because it is not possible to define adequately the actions persons should take, because these actions do not seem to relate directly to prevention of a condition, and because these actions may require radical changes in life, it is extremely difficult to effect desirable changes in behavior.

Present day health problems differ from those with which public health traditionally has been concerned in the amount of individual understanding necessary to prevent and cure the diseases or to avoid accidents. Avoiding disability and death from these causes depends a great deal more on individual understanding and action than did the prevention of the infectious diseases.

Not every person needs to know about or take specific preventive action to be protected from a communicable disease. For example, if a community through the action of a few of its citizens and its government installs a safe water supply and sanitary sewage disposal, all members of the community will benefit. The immunization of even a few children in a community affords some protection to the others, for each immune child in a population reduces the chance of transmission of the disease. Godfrey (*3*) in his epidemiological study of diphtheria reported that "in only two instances known to the writer has a community that had attained 30 percent immunization of its under-five age group suffered even a moderate epidemic."

Such community protection is not possible with the chronic diseases or accidents. Each individual is responsible for taking whatever action is necessary if he is to benefit from the various measures which medical science has provided for preventing or controlling today's diseases. Furthermore, not only must the individual take the action, but he must do it at an early stage of the disease, at a time when the findings of medical science will still benefit him. So far as accidents are concerned, however, even

though he tries to avoid hazards and to take all prescribed precautions, he is not always safe unless other people also know what to do and then do it.

The Health Educator's Job

The differences between the methods for prevention of acute and of chronic diseases greatly increase the scope and difficulty of the health educator's job. Each person must be reached with the educational message in a way that will insure his response, or else the efforts of health workers accomplish nothing. It is not enough to produce positive results with a few persons or even with the majority. Even approximating the achievement of such an all-inclusive goal will challenge every resource and all the imagination health educators can muster.

The problems of greatest community health significance today affect adults and older persons much more than did the contagious diseases. To be sure, many children suffer from rheumatic fever, diabetes, and some of the other chronic conditions, but the majority of the persons affected by chronic diseases are adults. As a rule, it is much easier to convince parents to take action for the health of their children than it is to convince them to do anything about their own health. Furthermore, the fact that health education for today's problems must be an attempt to effect change in the behavior of older adults adds to the complexity of the task ahead.

Integration of Services

Coping with today's problems effectively requires much more integration of health and related services than was necessary in making the progress of the past half century, when control of the communicable diseases was primarily a medical problem and when the entire responsibility was often assigned to the public health department. In the more successful health programs, the cooperation of the private physician was enlisted and the educational resources of the community were employed, but public health authorities have usually retained sole responsibility for preventing the spread of disease.

On the other hand, controlling the chronic diseases and solving the problems they bring to a family require the integrated efforts of many groups. All the medical resources of the community must be tapped—its health department, private physicians, and hospitals—as well as the facilities and services of many other social and welfare agencies if individuals with chronic disease are to be brought back to their maximum functioning capacity. Not only must there be competent medical diagnosis and treatment, but the social, economic, and emotional factors arising out of a long-time illness must be considered.

Home care, rehabilitation, retraining, and opportunity for employment of the handicapped are among the services needed. These are provided by a variety of agencies, all of which have shared responsibilities and must work together if they are to reduce the chronic disease problem. To accomplish the integration of these services in the control of the chronic diseases requires that workers in the various agencies become more efficient in collaborative thinking and in carrying out a cooperative program.

Integration of health and welfare services poses two distinct but equally difficult educational problems. The first of these concerns interagency planning and program operation. How can the working policies and practices of agencies that historically have functioned almost independently be modified to coordinate with other agencies for maximum service without duplication or conflict? Solving this problem means education of not only the executives and workers of the agencies, but also of members of their boards. Furthermore, the emphasis today on clear-cut lines of administration and responsibility, the difficulties involved in joint planning, and the disapproval of joint program operation by specialists in administration make this problem even more difficult. Nevertheless, all who are interested in attacking successfully today's problems must contribute toward finding more effective ways of integrating the necessary skills and services.

The second educational problem which this complex of agency services poses is the liklihood that conflicting advice will be given to the public from the several agencies, and the increased possibility that an individual may become dissatisfied with one or more of the groups

with which he must deal. Such experiences make the task of stimulating continued positive health action on the part of the individual extremely difficult. To the extent that the individual imparts his feelings of dissatisfaction to his associates, they will be resistant to taking the desirable action suggested by the health educator.

In this connection, educators have a special responsibility to sensitize the personnel of health and welfare agencies to the educational effects of the service experience of an individual, and particularly to the potent influence of an unpleasant or unsatisfactory experience.

Health Education Content Today

The preceding discussion of educational difficulties in coping with today's health problems emphasizes the challenge with which health educators are faced. Let us look at a few implications of this challenge for educational content and method, and for the appropriate places to concentrate our effort.

If the challenge is to be met most of the educational efforts must be concentrated upon adults outside the classroom where the problems may arise. It will not suffice to give students in grade school or even in college a body of the latest scientific information and expect them to use the information when they reach the age when chronic diseases are most prevalent. Such an expectation overlooks an important research finding in psychology—we forget rapidly information which is not functional in our daily lives.

But even if people did remember everything they learned in grade school or college, would the latest scientific information of today serve as guides to the behavior of students when they become older? Certainly, everyone would hope not, for, with the dynamic nature of medical research today, there is every indication that many of the tools for dealing with the diseases of today will become much more precise. If the limited information now available were remembered and used by students in later life, it might serve as a deterrent to the real action the students should take. To illustrate this point, here is an exact quotation from one of the textbooks of about 40 years ago (*4*): "A life out of doors all day long, summer and winter, has cured many cases [tuberculosis]. It is now considered the only cure for the disease." Certainly no one would want people to act in terms of that information today.

What then should be the educational focus? Rather than concentrating on imparting an organized series of health facts, should the major emphasis not be on developing among students skill in solving health problems when they occur? In every school or college, some health situation is constantly arising in which individuals or groups must take action for their health. All too often, instructors decide upon the action to be taken without giving students the opportunity to gather information regarding the problem, to evaluate it, to develop their own solution, and to put these solutions into operation.

If, however, students have the experience of making the decisions, they will learn how to assemble pertinent facts from a variety of sources—a far more important achievement than that of having acquired an extensive body of knowledge about health. They will also have an opportunity to develop the ability to discriminate between reliable and unreliable information. This latter skill is particularly important at this time, for with the rapid advance of scientific discovery, it is often not easy to distinguish research achievement from the exorbitant claims of quacks or the overzealous desire for publicity on the part of a pseudo-investigator.

One other aspect of the educational content of today's health problems which should be considered is that the action which must be taken to deal with present problems frequently conflicts with some of our traditional value systems. We have been a pioneering people, more concerned with advancing our economic welfare and that of the country than in the health and other hazards encountered in the pioneering effort. As a result, we tend to look with a certain amount of disdain upon the person who is concerned with avoiding danger, or who exercises reasonable caution in avoiding crippling injuries or disabling disease. Could it be that this value system accounts in part for lack of concern about the rules of health, dangerous conditions around the home, or for the tendency

to take unnecessary risks in order to get somewhere in under-record time? Now that we are no longer pioneers in the sense that we do not need to take undue physical risks in order to progress, should we not consider a change in implied approval, if not outright praise, which our culture places on those who disregard the rules for health and safety? If society frowned upon taking unreasonable and unnecessary chances, it might be a real stimulus to positive action for controlling the ravages of chronic diseases and accidents.

Aging presents another type of cultural problem. To provide financial security for individuals as they grow old, fairly rigid retirement systems have been developed. When these systems were being established, they were considered a real social advance in that an individual's support was assured as he reached old age. Coupled with these insurance systems there gradually disappeared the long-cherished cultural pattern of families looking after their older members and fitting them into the family structure.

Consequently, there has arisen a tendency to set older people aside as they retire. They are left without activity and usefulness—literally placed on the shelf. We are now coming to realize that much of what is popularly called senility is really confusion, moodiness, forgetfulness, depression, and irritability brought on by social isolation and lack of mental stimulation—with little or no organic deterioration.

A Norristown, Pa., physician (*5*) has been successfully treating patients with seeming senility through individual and group psychotherapy, creative crafts, and recreation, because he was convinced that mental decline can be postponed.

It would seem then that our educational task in retarding the physiological and mental deterioration of older persons is to help reorient our cultural patterns with respect to them before and after retirement and to provide these senior members of our society with educational opportunities for developing some of their latent talents or realizing some of their avocational desires.

Summary

Almost unbelievable progress in reducing death from the communicable diseases has been made in our lifetime. Health education has had some small part in helping to bring about this achievement.

Today, we are faced with a host of health problems which require individual action if people are to benefit from the findings of scientific investigators. Bringing about that action requires education. The task is made unusually difficult because of the insidious nature of the chronic diseases, the lack of specific remedies that are universally effective, the delayed effect of any action individuals may take, the age-group which must be influenced, the large number of agencies that are involved, and the need for modification of some of our cultural patterns and value systems. This is the challenge to the profession of health education.

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PUBLIC HEALTH REPORTS

Volume 69, Numbers 1–12
January–December 1954

including

PUBLIC HEALTH MONOGRAPHS

1954 Titles, Numbers 18–24

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

THE INDEX to *Public Health Reports* and Public Health Monographs has two parts.

In part 1 are the author, title, and subject entries of material appearing in *Public Health Reports*, including summary and interpretive articles accompanying the announcement of the publication of a monograph. Monograph authors are cross-indexed to part 2.

Part 2 lists by number, title, and author the monographs issued concurrently with *Public Health Reports*.

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Titles of current publications appear under the entry "Publications." A compiled annual list of Public Health Service publications may be obtained from the Public Inquiries Branch.

It is recommended that the front covers of each issue be included in a bound volume, thus retaining the illustrative material on the inside of the cover.

A cumulative manuscript file (1952–1954) is available for consultation.

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(B) Brief
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(LN) Legal note
(MI) Monograph interpretive article
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